



STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF WATER RESOURCES  
William R. Snodgrass - Tennessee Tower  
312 Rosa L. Parks Avenue, 11<sup>th</sup> Floor  
Nashville, Tennessee 37243-1102

July 11, 2017

Mr. Darren Gore, P.E.  
Director of Water and Sewer Department  
e-copy: dgore@murfreesborotn.gov  
City of Murfreesboro  
300 NW Broad St.  
Murfreesboro, TN 37130

Subject: **Draft of Modified NPDES Permit No. TN0022586**  
**City of Murfreesboro d/b/a Sinking Creek STP**  
**Murfreesboro, Rutherford County, Tennessee**

Dear Mr. Gore:

Enclosed please find a draft copy of the modified NPDES Permit No. TN0022586 which the Division of Water Resources proposes to issue. This draft copy is furnished to you solely for your review of its provisions. No wastewater discharges are authorized by this modified permit. The issuance of an official modified permit is contingent upon your meeting all of the requirements of the Tennessee Water Quality Control Act and the Rules and Regulations of the Tennessee Water Quality, Oil and Gas Board.

Also enclosed is a copy of the public notice that announces our intent to issue this permit. The notice affords the public an opportunity to review the draft permit and, if necessary, request a public hearing on this issuance process. If you disagree with the provisions and requirements contained in the draft permit, you have thirty (30) days from the date of this correspondence to notify the division of your objections. If your objections cannot be resolved, you may appeal this permit upon issuance. This appeal should be filed in accordance with Section 69-3-110 of the Tennessee Code Annotated.

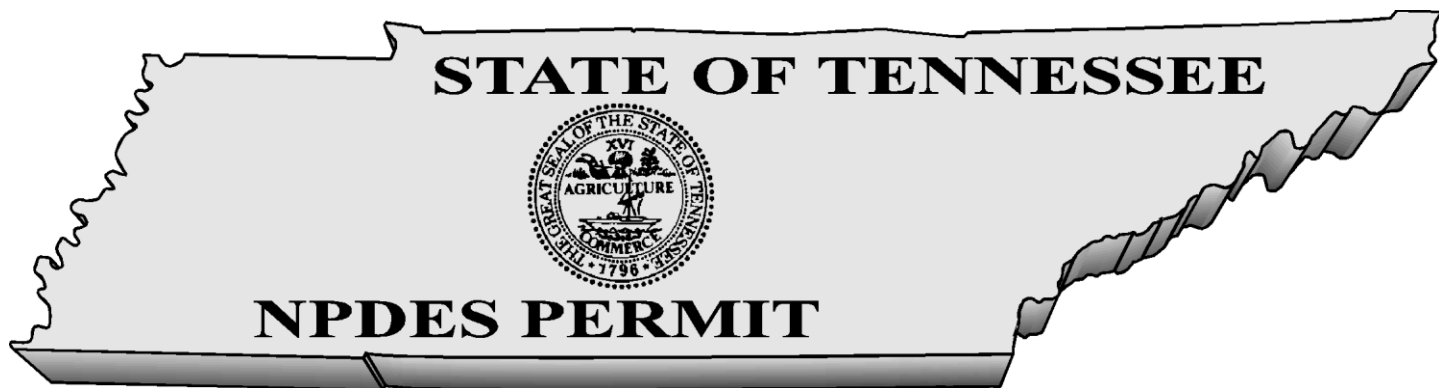
If you have questions, please contact the Nashville Environmental Field Office at 1-888-891-TDEC; or, at this office, please contact Miss Julie Harse at (615) 532-0682 or by E-mail at *Julie.Harse@tn.gov*.

Sincerely,

Vojin Janjic  
Manager, Water-Based Systems

Enclosure

cc: Permit Section File  
Nashville Environmental Field Office  
NPDES Permit Section, EPA Region IV, r4npdespermits@epa.gov  
Mr. John Strickland, Plant Manager, Sinking Creek Wastewater Treatment Plant, jstrickland@murfreesborotn.gov  
Mr. Kevin Relford, Manager, Water Treatment Plant, Smyrna Water System, kevin.relford@townofsmyrna.org  
Ms. Valerie Smith, City of Murfreesboro, vsmith@murfreesborotn.gov  
Ms. Dana L. Wright, Director of Policy and Legislative Affairs, TCWN, dana@tcwn.org



*Modified*  
**No. TN0022586**

Authorization to discharge under the  
National Pollutant Discharge Elimination System (NPDES)

Issued By

**STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF WATER RESOURCES  
William R. Snodgrass - Tennessee Tower  
312 Rosa L. Parks Avenue, 11<sup>th</sup> Floor  
Nashville, Tennessee 37243-1102**

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger: **Murfreesboro-Sinking Creek STP**

is authorized to discharge: **Treated municipal wastewater from Outfall 001 and distribution of treated municipal wastewater for non-potable reuse.**

from a facility located: **in Murfreesboro, Rutherford County, Tennessee**

to receiving waters named: **West Fork of the Stones River at mile 10.5**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on:

This permit shall expire on: **August 31, 2021**

Issuance date:

**Draft**

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for Tisha Calabrese Benton  
Director

## TABLE OF CONTENTS

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	<u>Page</u>
<b>1.0. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS .....</b>	<b>1</b>
1.1. NUMERIC AND NARRATIVE EFFLUENT LIMITATIONS .....	1
1.2. NUMERIC AND NARRATIVE REUSE - EFFLUENT LIMITATIONS.....	7
1.3. MONITORING PROCEDURES.....	9
1.3.1. Representative Sampling .....	9
1.3.2. Sampling Frequency .....	10
1.3.3. Test Procedures .....	10
1.3.4. Recording of Results .....	11
1.3.5. Records Retention.....	11
1.4. REPORTING .....	11
1.4.1. Monitoring Results.....	11
1.4.2. Additional Monitoring by Permittee .....	12
1.4.3. Falsifying Results and/or Reports .....	12
1.4.4. Monthly Report of Operation.....	13
1.4.5. Bypass and Overflow Reporting .....	13
1.3.5.1. Report Requirements .....	13
1.3.5.2. Anticipated Bypass Notification .....	13
1.4.6. Reporting Less Than Detection .....	13
1.5. COMPLIANCE WITH SECTION 208.....	14
1.6. REOPENER CLAUSE .....	14
1.7. SCHEDULE OF COMPLIANCE .....	14
<b>2.0. GENERAL PERMIT REQUIREMENTS.....</b>	<b>15</b>
2.1. GENERAL PROVISIONS.....	15
2.1.1. Duty to Reapply .....	15
2.1.2. Right of Entry .....	15
2.1.3. Availability of Reports .....	15
2.1.4. Proper Operation and Maintenance .....	16
2.1.5. Treatment Facility Failure (Industrial Sources).....	16
2.1.6. Property Rights.....	16
2.1.7. Severability.....	16
2.1.8. Other Information .....	16
2.2. CHANGES AFFECTING THE PERMIT.....	17
2.2.1. Planned Changes.....	17
2.2.2. Permit Modification, Revocation, or Termination.....	17
2.2.3. Change of Ownership.....	17
2.2.4. Change of Mailing Address .....	18

2.3.	NONCOMPLIANCE .....	18
2.3.1.	Effect of Noncompliance .....	18
2.3.2.	Reporting of Noncompliance .....	18
2.3.3.	Overflow .....	19
2.3.4.	Upset.....	20
2.3.5.	Adverse Impact .....	20
2.3.6.	Bypass .....	21
2.3.7.	Washout.....	21
2.4.	LIABILITIES .....	22
2.4.1.	Civil and Criminal Liability .....	22
2.4.2.	Liability Under State Law .....	22
<b>3.0.</b>	<b>PERMIT SPECIFIC REQUIREMENTS .....</b>	<b>22</b>
3.1.	CERTIFIED OPERATOR .....	22
3.2.	POTW PRETREATMENT PROGRAM GENERAL PROVISIONS .....	22
3.3.	BIOSOLIDS MANAGEMENT PRACTICES .....	27
3.4.	BIOMONITORING REQUIREMENTS, CHRONIC.....	27
3.5.	PLACEMENT OF SIGNS .....	30
3.6.	ANTIDegradation .....	31
3.7.	TREATED WATER REUSE .....	31
<b>4.0.</b>	<b>DEFINITIONS AND ACRONYMS .....</b>	<b>32</b>
4.1.	DEFINITIONS .....	32
4.2.	ACRONYMNS AND ABBREVIATIONS.....	36
<b>RATIONALE</b> .....		<b>1</b>
1.	FACILITY INFORMATION .....	1
2.	RECEIVING STREAM INFORMATION.....	1
3.	CURRENT PERMIT STATUS.....	2
4.	NEW PERMIT LIMITATIONS AND COMPLIANCE SCHEDULE SUMMARY .....	2
5.	PREVIOUS PERMIT DISCHARGE MONITORING REPORT REVIEW .....	2
6.	PROPOSED EFFLUENT LIMITS AND RATIONALE .....	4
6.1.	CBOD <sub>5</sub> , Dissolved Oxygen, and Percent Removals Requirements .....	7
6.2.	NH <sub>3</sub> -N toxicity .....	7
6.3.	Chlorination .....	9
6.4.	settleable solids limitation .....	9
6.5.	Total Nitrogen and Total Phosphorous Limitations .....	9
6.6.	<i>E. coli</i> Requirements .....	11
6.7.	Biomonitoring .....	11
6.8.	Metals and Toxics .....	12
6.9.	Volatile Organic, Acid-Extractable, and Base-Neutral Compounds .....	13
6.10.	Overflow and Bypass Reporting .....	15

7.	OTHER PERMIT REQUIREMENTS AND CONDITIONS.....	16
7.1.	Certified Wastewater Treatment Operator .....	16
7.2.	Collection System Certified Operator.....	16
7.3.	Pretreatment Program .....	16
7.4.	Biosolids/Sludge Management .....	16
7.5.	Permit Term .....	17
8.	ANTIDegradation Statement/Water Quality Status .....	17
<b>APPENDIX 1</b>	.....	<b>18</b>
<b>APPENDIX 2</b>	.....	<b>22</b>
<b>APPENDIX 3</b>	.....	<b>25</b>
<b>APPENDIX 4</b>	.....	<b>32</b>

JAH  
TN0022586PMT.DOC

## 1.0. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

### 1.1. NUMERIC AND NARRATIVE EFFLUENT LIMITATIONS

The city of Murfreesboro is authorized to discharge treated municipal wastewater from Outfall 001 to the West Fork of the Stones River at mile 10.5. It is also authorized to distribute treated municipal wastewater for non-potable reuse. Discharge 001 consists of municipal wastewater from a treatment facility with a current design capacity of 16 MGD. The current plant contains two oxidation basins with a design capacity of 8 MGD for each basin. The facility is in the process of constructing an additional 8 MGD oxidation basin to expand the capacity to 24 MGD. The permit modification in December 2014 increased the permit discharge to 20 MGD year round. The current discharge locations have the capacity to discharge 24 MGD in the winter. The permit may be expanded in the future to 24 MGD when the facility has sufficient disposal means in the summer for an additional 4 MGD. Discharge 001 shall be limited and monitored by the permittee as specified in the below tables. When the facility has completed construction on the new oxidation basin, it will need to notify the division's enforcement and compliance section in writing the date that the facility switches from the 16 MGD design flow limits to the 20 MGD design flow limits.

#### 16 MGD Design Flow Permit Limits

Description : External Outfall, Number : 001, Monitoring : All Weather, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
80998	Bypass of Treatment	Report	-	occur/mo	Occurrences	Continuous	Monthly Total

Description : External Outfall, Number : 001, Monitoring : Dry Weather, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
74062	Overflow use, occurrences	Report	-	occur/mo	Occurrences	Continuous	Monthly Total

Description : External Outfall, Number : 001, Monitoring : Effluent Gross, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00300	Oxygen, dissolved (DO)	>=	6.0	mg/L	Grab	Daily	Instantaneous Minimum
00400	pH	>=	6.0	SU	Grab	Daily	Minimum
00400	pH	<=	9.0	SU	Grab	Daily	Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Composite	Weekly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	4003	lb/d	Composite	Weekly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	40	mg/L	Composite	Weekly	Weekly Average
00530	Total Suspended Solids (TSS)	<=	5338	lb/d	Composite	Weekly	Weekly Average
00530	Total Suspended Solids (TSS)	<=	45	mg/L	Composite	Weekly	Daily Maximum
00545	Settleable Solids	<=	1.0	mL/L	Grab	Monthly	Daily Maximum

-00600	Nitrogen, total (as N)	<=	9	mg/L	Composite	Twice Per Month	Monthly Average
00600	Nitrogen, total (as N)	<=	1201	lb/d	Composite	Twice Per Month	Monthly Average
00630	Nitrite plus Nitrate (as N)	Report	-	mg/L	Composite	Twice Per Month	Daily Maximum
00630	Nitrite plus Nitrate (as N)	Report	-	lb/d	Composite	Twice Per Month	Monthly Average
00630	Nitrite plus Nitrate (as N)	Report	-	lb/d	Composite	Twice Per Month	Daily Maximum
00630	Nitrite plus Nitrate (as N)	Report	-	mg/L	Composite	Twice Per Month	Monthly Average
00630	Nitrite plus Nitrate (as N)	<=	520	lb/d	Calculated	Annual	Annual Average
00665	Phosphorus, total (as P)	Report	-	lb/d	Composite	Twice Per Month	Daily Maximum
00665	Phosphorus, total (as P)	Report	-	lb/d	Composite	Twice Per Month	Monthly Average
00665	Phosphorus, total (as P)	Report	-	mg/L	Composite	Twice Per Month	Daily Maximum
00665	Phosphorus, total (as P)	Report	-	mg/L	Composite	Twice Per Month	Monthly Average
00665	Phosphorus, total (as P)	<=	307	lb/d	Calculated	Annual	Annual Average
00720	Cyanide, total (as CN)	<=	0.130	mg/L	Grab	Monthly	Monthly Average
00720	Cyanide, total (as CN)	<=	0.260	mg/L	Grab	Monthly	Daily Maximum
00722	Cyanide, free (amen. to chlorination)	<=	.0047	mg/L	Grab	Monthly	Monthly Average
00722	Cyanide, free (amen. to chlorination)	<=	.02	mg/L	Grab	Monthly	Daily Maximum
50050	Flow	Report	-	Mgal/d	Continuous	Daily	Daily Maximum
50050	Flow	Report	-	Mgal/d	Continuous	Daily	Monthly Average
51040	E. coli	<=	941	#/100mL	Grab	Daily	Daily Maximum
51040	E. coli	<=	126	#/100mL	Grab	Daily	Monthly Geometric Mean
51504	UV Light Working	Report	-	pass=0/fail=1	Visual	Daily When Discharging	Value

Description : External Outfall, Number : 001, Monitoring : Effluent Gross, Season : Summer

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00610	Nitrogen, Ammonia total (as N)	<=	2	mg/L	Composite	Two Per Week	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	1	mg/L	Composite	Two Per Week	Monthly Average
00610	Nitrogen, Ammonia total (as N)	<=	200	lb/d	Composite	Two Per Week	Weekly Average
00610	Nitrogen, Ammonia total (as N)	<=	1.5	mg/L	Composite	Two Per Week	Weekly Average
00610	Nitrogen, Ammonia total (as N)	<=	133	lb/d	Composite	Two Per Week	Monthly Average
80082	CBOD, 5-day, 20 C	<=	5	mg/L	Composite	Two Per Week	Monthly Average

80082	CBOD, 5-day, 20 C	<=	1001	lb/d	Composite	Two Per Week	Weekly Average
80082	CBOD, 5-day, 20 C	<=	667	lb/d	Composite	Two Per Week	Monthly Average
80082	CBOD, 5-day, 20 C	<=	10	mg/L	Composite	Two Per Week	Daily Maximum
80082	CBOD, 5-day, 20 C	<=	7.5	mg/L	Composite	Two Per Week	Weekly Average
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>	99	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales	>	99	%	Composite	Semiannual	Minimum

Description : External Outfall, Number : 001, Monitoring : Effluent Gross, Season : Winter

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00610	Nitrogen, Ammonia total (as N)	<=	3.3	mg/L	Composite	Two Per Week	Weekly Average
00610	Nitrogen, Ammonia total (as N)	<=	4.4	mg/L	Composite	Two Per Week	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	294	lb/d	Composite	Two Per Week	Monthly Average
00610	Nitrogen, Ammonia total (as N)	<=	440	lb/d	Composite	Two Per Week	Weekly Average
00610	Nitrogen, Ammonia total (as N)	<=	2.2	mg/L	Composite	Two Per Week	Monthly Average
80082	CBOD, 5-day, 20 C	<=	20	mg/L	Composite	Two Per Week	Daily Maximum
80082	CBOD, 5-day, 20 C	<=	1334	lb/d	Composite	Two Per Week	Monthly Average
80082	CBOD, 5-day, 20 C	<=	2002	lb/d	Composite	Two Per Week	Weekly Average
80082	CBOD, 5-day, 20 C	<=	15	mg/L	Composite	Two Per Week	Weekly Average
80082	CBOD, 5-day, 20 C	<=	10	mg/L	Composite	Two Per Week	Monthly Average
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>	74	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales	>	74	%	Composite	Semiannual	Minimum

Description : External Outfall, Number : 001, Monitoring : Percent Removal, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
80358	CBOD, 5-day, 20 C, % removal	>=	40	%	Calculated	Two Per Week	Daily Minimum
80358	CBOD, 5-day, 20 C, % removal	>=	85	%	Calculated	Two Per Week	Monthly Average Minimum
81011	TSS, % removal	>=	85	%	Calculated	Two Per Week	Monthly Average Minimum
81011	TSS, % removal	>=	40	%	Calculated	Two Per Week	Daily Minimum

Description : External Outfall, Number : 001, Monitoring : Raw Sewage Influent, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00530	Total Suspended Solids (TSS)	Report	-	mg/L	Composite	Weekly	Daily Maximum
00530	Total Suspended Solids (TSS)	Report	-	mg/L	Composite	Weekly	Monthly Average
50050	Flow	Report	-	Mgal/d	Continuous	Daily	Monthly Average



50050	Flow	Report	-	Mgal/d	Continuous	Daily	Daily Maximum
80082	CBOD, 5-day, 20 C	Report	-	mg/L	Composite	Two Per Week	Daily Maximum
80082	CBOD, 5-day, 20 C	Report	-	mg/L	Composite	Two Per Week	Monthly Average

Description : External Outfall, Number : 001, Monitoring : Wet Weather, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
74062	Overflow use, occurrences	Report	-	occur/mo	Occurrences	Continuous	Monthly Total

1. Notes: The permittee shall achieve 85% removal of CBOD<sub>5</sub> and TSS on a monthly average basis. The permittee shall report all instances of overflow and/or bypasses. See Part 2.3.3.a for the definition of overflow and Part 1.3.5.1 for reporting requirements.
2. Unless elsewhere specified, summer months are May through October; winter months are November through April.
3. See Part 1.3.3 for test procedures.
4. See Part 3.4 for biomonitoring test and reporting requirements. See next page for percent removal calculations.
5. The average daily loads (ADL) for Nitrite plus Nitrate and TP shall be calculated as the twelve-month average of the daily loads (concentrations and their associated flows) measured during the reporting period.

### **20 MGD Design Flow Permit Limits**

Description : External Outfall, Number : 001, Monitoring : All Weather, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
80998	Bypass of Treatment	Report	-	occur/mo	Occurrences	Continuous	Monthly Total

Description : External Outfall, Number : 001, Monitoring : Dry Weather, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
74062	Overflow use, occurrences	Report	-	occur/mo	Occurrences	Continuous	Monthly Total

Description : External Outfall, Number : 001, Monitoring : Effluent Gross, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00300	Oxygen, dissolved (DO)	>=	6.0	mg/L	Grab	Daily	Instantaneous Minimum
00400	pH	>=	6.0	SU	Grab	Daily	Minimum
00400	pH	<=	9.0	SU	Grab	Daily	Maximum
00530	Total Suspended Solids (TSS)	<=	24	mg/L	Composite	Weekly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	36	mg/L	Composite	Weekly	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	5338	lb/d	Composite	Weekly	Weekly Average
00530	Total Suspended Solids (TSS)	<=	4003	lb/d	Composite	Weekly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	32	mg/L	Composite	Weekly	Weekly Average
00545	Settleable Solids	<=	1.0	mL/L	Grab	Monthly	Daily Maximum

00600	Nitrogen, total (as N)	Report	-	lb/d	Composite	Twice Per Month	Monthly Average
00600	Nitrogen, total (as N)	<=	1201	lb/d	Composite	Annual	Annual Average
00630	Nitrite plus Nitrate (as N)	Report	-	lb/d	Composite	Twice Per Month	Daily Maximum
00630	Nitrite plus Nitrate (as N)	Report	-	lb/d	Composite	Twice Per Month	Monthly Average
00630	Nitrite plus Nitrate (as N)	Report	-	mg/L	Composite	Twice Per Month	Daily Maximum
00630	Nitrite plus Nitrate (as N)	Report	-	mg/L	Composite	Twice Per Month	Monthly Average
00630	Nitrite plus Nitrate (as N)	<=	520	lb/d	Calculated	Annual	Annual Average
00665	Phosphorus, total (as P)	Report	-	mg/L	Composite	Twice Per Month	Daily Maximum
00665	Phosphorus, total (as P)	Report	-	mg/L	Composite	Twice Per Month	Monthly Average
00665	Phosphorus, total (as P)	Report	-	lb/d	Composite	Twice Per Month	Monthly Average
00665	Phosphorus, total (as P)	Report	-	lb/d	Composite	Twice Per Month	Daily Maximum
00665	Phosphorus, total (as P)	<=	307	lb/d	Calculated	Annual	Annual Average
00720	Cyanide, total (as CN)	<=	0.130	mg/L	Grab	Monthly	Monthly Average
00720	Cyanide, total (as CN)	<=	0.260	mg/L	Grab	Monthly	Daily Maximum
00722	Cyanide, free (amen. to chlorination)	<=	.0047	mg/L	Grab	Monthly	Monthly Average
00722	Cyanide, free (amen. to chlorination)	<=	.02	mg/L	Grab	Monthly	Daily Maximum
50050	Flow	Report	-	Mgal/d	Continuous	Daily	Daily Maximum
50050	Flow	Report	-	Mgal/d	Continuous	Daily	Monthly Average
51040	E. coli	<=	941	#/100mL	Grab	Daily	Daily Maximum
51040	E. coli	<=	126	#/100mL	Grab	Daily	Monthly Geometric Mean
51504	UV Light Working	Report	-	pass=0/fail=1	Visual	Daily When Discharging	Value

Description : External Outfall, Number : 001, Monitoring : Effluent Gross, Season : Summer

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00610	Nitrogen, Ammonia total (as N)	<=	1.2	mg/L	Composite	Two Per Week	Weekly Average
00610	Nitrogen, Ammonia total (as N)	<=	133	lb/d	Composite	Two Per Week	Monthly Average
00610	Nitrogen, Ammonia total (as N)	<=	.8	mg/L	Composite	Two Per Week	Monthly Average
00610	Nitrogen, Ammonia total (as N)	<=	1.6	mg/L	Composite	Two Per Week	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	200	lb/d	Composite	Two Per Week	Weekly Average
80082	CBOD, 5-day, 20 C	<=	667	lb/d	Composite	Two Per Week	Monthly Average
80082	CBOD, 5-day, 20 C	<=	6	mg/L	Composite	Two Per Week	Weekly Average

80082	CBOD, 5-day, 20 C	<=	4	mg/L	Composite	Two Per Week	Monthly Average
80082	CBOD, 5-day, 20 C	<=	8	mg/L	Composite	Two Per Week	Daily Maximum
80082	CBOD, 5-day, 20 C	<=	1001	lb/d	Composite	Two Per Week	Weekly Average
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>	99	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales	>	99	%	Composite	Semiannual	Minimum

Description : External Outfall, Number : 001, Monitoring : Effluent Gross, Season : Winter

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00610	Nitrogen, Ammonia total (as N)	<=	294	lb/d	Composite	Two Per Week	Monthly Average
00610	Nitrogen, Ammonia total (as N)	<=	440	lb/d	Composite	Two Per Week	Weekly Average
00610	Nitrogen, Ammonia total (as N)	<=	2.6	mg/L	Composite	Two Per Week	Weekly Average
00610	Nitrogen, Ammonia total (as N)	<=	1.8	mg/L	Composite	Two Per Week	Monthly Average
00610	Nitrogen, Ammonia total (as N)	<=	3.5	mg/L	Composite	Two Per Week	Daily Maximum
80082	CBOD, 5-day, 20 C	<=	12	mg/L	Composite	Two Per Week	Weekly Average
80082	CBOD, 5-day, 20 C	<=	16	mg/L	Composite	Two Per Week	Daily Maximum
80082	CBOD, 5-day, 20 C	<=	2002	lb/d	Composite	Two Per Week	Weekly Average
80082	CBOD, 5-day, 20 C	<=	1334	lb/d	Composite	Two Per Week	Monthly Average
80082	CBOD, 5-day, 20 C	<=	8	mg/L	Composite	Two Per Week	Monthly Average
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>	78	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales	>	78	%	Composite	Semiannual	Minimum

Description : External Outfall, Number : 001, Monitoring : Percent Removal, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
80358	CBOD, 5-day, 20 C, % removal	>=	85	%	Calculated	Two Per Week	Monthly Average Minimum
80358	CBOD, 5-day, 20 C, % removal	>=	40	%	Calculated	Two Per Week	Daily Minimum
81011	TSS, % removal	>=	85	%	Calculated	Two Per Week	Monthly Average Minimum
81011	TSS, % removal	>=	40	%	Calculated	Two Per Week	Daily Minimum

Description : External Outfall, Number : 001, Monitoring : Raw Sewage Influent, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00530	Total Suspended Solids (TSS)	Report	-	mg/L	Composite	Weekly	Daily Maximum
00530	Total Suspended Solids (TSS)	Report	-	mg/L	Composite	Weekly	Monthly Average
50050	Flow	Report	-	Mgal/d	Continuous	Daily	Monthly Average
50050	Flow	Report	-	Mgal/d	Continuous	Daily	Daily Maximum

80082	CBOD, 5-day, 20 C	Report	-	mg/L	Composite	Two Per Week	Daily Maximum
80082	CBOD, 5-day, 20 C	Report	-	mg/L	Composite	Two Per Week	Monthly Average

Description : External Outfall, Number : 001, Monitoring : Wet Weather, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
74062	Overflow use, occurrences	Report	-	occur/mo	Occurrences	Continuous	Monthly Total

1. Notes: The permittee shall achieve 85% removal of CBOD<sub>5</sub> and TSS on a monthly average basis. The permittee shall report all instances of overflow and/or bypasses. See Part 2.3.3.a for the definition of overflow and Part 1.3.5.1 for reporting requirements.
2. Unless elsewhere specified, summer months are May through October; winter months are November through April.
3. See Part 1.3.3 for test procedures.
4. See Part 3.4 for biomonitoring test and reporting requirements. See next page for percent removal calculations.
5. The average daily loads (ADL) for Nitrite plus Nitrate and TP shall be calculated as the twelve-month average of the daily loads (concentrations and their associated flows) measured during the reporting period.

## 1.2. NUMERIC AND NARRATIVE REUSE - EFFLUENT LIMITATIONS

The City of Murfreesboro is authorized to distribute treated municipal wastewater for non-potable reuse. The reuse water shall be limited and monitored by the permittee as specified below:

Description : External Outfall, Number : 01T, Monitoring : Effluent Gross, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
50050	Flow	Report	-	Mgal/d	Composite	Continuous	Daily Maximum
50050	Flow	Report	-	Mgal/d	Composite	Continuous	Monthly Average
50060	Chlorine, total residual (TRC)(after 30 minutes)	>=	1.0	mg/L	Grab	Daily	Daily Minimum
51040	E. coli	<=	23	#/100mL	Grab	Daily	Daily Maximum

- (1) Daily *E.coli* and residual chlorine samples should be collected at the point of release from the treatment system. Quarterly *E.coli* and residual chlorine samples should be collected for analysis at two points within the distribution system: one that is representative of the system's average residence time and one that is representative of the system's maximum residence time.
- (2) Total residual chlorine (TRC) monitoring shall be applicable when chlorine, bromine, or any other oxidants are added. The acceptable methods for analysis of TRC are any

methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit.

This permit allows the operation of a water reuse system. The operation should be such that there is no contamination of and no wastewater discharge to any surface or subsurface stream because of collected pools of water called “ponding” or because of improper irrigation. Any runoff due to improper operation must be reported in writing to the Division of Water Resources, Environmental Field Office - Nashville within 5 days of the incident. In addition, the reuse irrigation system must be operated in a manner preventing the creation of a public health hazard or a public/private nuisance. Additional requirements are found in Section 3.7.

Total residual chlorine (TRC) monitoring shall be applicable when chlorine, bromine, or any other oxidants are added. The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit.

The wastewater discharge must be disinfected to the extent that viable coliform organisms are effectively eliminated. The concentration of the *E. coli* group after disinfection shall not exceed 126 cfu per 100 ml as the geometric mean calculated on the actual number of samples collected and tested for *E. coli* within the required reporting period. The permittee may collect more samples than specified as the monitoring frequency. Samples may not be collected at intervals of less than 12 hours. For the purpose of determining the geometric mean, individual samples having an *E. coli* group concentration of less than one (1) per 100 ml shall be considered as having a concentration of one (1) per 100 ml. In addition, the concentration of the *E. coli* group in any individual sample shall not exceed a specified maximum amount. A maximum daily limit of 487 colonies per 100 ml applies to lakes and exceptional Tennessee waters. A maximum daily limit of 941 colonies per 100 ml applies to all other recreational waters.

There shall be no distinctly visible floating scum, oil or other matter contained in the wastewater discharge. The wastewater discharge must not cause an objectionable color contrast in the receiving stream.

The wastewater discharge shall not contain pollutants in quantities that will be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.

Sludge or any other material removed by any treatment works must be disposed of in a manner that prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and the Tennessee Hazardous Waste Management Act, TCA 68-46-101 et seq.

Nothing in this permit authorizes take for the purposes of a facility's compliance with the Endangered Species Act. (40 C.F.R. 125.98(b)(1))

For the purpose of evaluating compliance with the permit limits established herein, where certain limits are below the State of Tennessee published required detection levels (RDLs) for any given effluent characteristics, the results of analyses below the RDL shall be reported as Below Detection Level (BDL), unless in specific cases other detection limits are demonstrated to be the best achievable because of the particular nature of the wastewater being analyzed.

For CBOD<sub>5</sub> and TSS, the treatment facility shall demonstrate a minimum of 85% removal efficiency on a monthly average basis. This is calculated by determining an average of all daily influent concentrations and comparing this to an average of all daily effluent concentrations. The formula for this calculation is as follows:

$$\left[ 1 - \frac{\text{average of daily effluent concentration}}{\text{average of daily influent concentration}} \right] \times 100\% = \% \text{ removal}$$

The treatment facility will also demonstrate 40% minimum removal of the CBOD<sub>5</sub> and TSS based upon each daily composite sample. The formula for this calculation is as follows:

$$\left[ 1 - \frac{\text{daily effluent concentration}}{\text{daily influent concentration}} \right] \times 100\% = \% \text{ removal}$$

### **1.3. MONITORING PROCEDURES**

#### **1.3.1. Representative Sampling**

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than plus or minus 10% from the true discharge rates throughout the range of expected discharge volumes.

Samples and measurements taken in compliance with the monitoring requirements specified above shall be representative of the volume and nature of the monitored discharge, and shall be taken at the following location(s):

Influent samples must be collected prior to mixing with any other wastewater being returned to the head of the plant, such as sludge return. Those systems with more than one influent line must collect samples from each and proportion the results by the flow from each line.

Effluent samples must be representative of the wastewater being discharged and collected prior to mixing with any other discharge or the receiving stream. This can be a different point for different parameters, but must be after all treatment for that parameter or all expected change:

- a. The chlorine residual must be measured after the chlorine contact chamber and any dechlorination. It may be to the advantage of the permittee to measure at the end of any long outfall lines.
- b. Samples for *E. coli* can be collected at any point between disinfection and the actual discharge.
- c. The dissolved oxygen can drop in the outfall line; therefore, D.O. measurements are required at the discharge end of outfall lines greater than one mile long. Systems with outfall lines less than one mile may measure dissolved oxygen as the wastewater leaves the treatment facility. For systems with dechlorination, dissolved oxygen must be measured after this step and as close to the end of the outfall line as possible.
- d. Total suspended solids and settleable solids can be collected at any point after the final clarifier.
- e. Biomonitoring tests (if required) shall be conducted on final effluent.

### **1.3.2. Sampling Frequency**

Where the permit requires sampling and monitoring of a particular effluent characteristic(s) at a frequency of less than once per day or daily, the permittee is precluded from marking the "No Discharge" block on the Discharge Monitoring Report if there has been any discharge from that particular outfall during the period which coincides with the required monitoring frequency; i.e. if the required monitoring frequency is once per month or 1/month, the monitoring period is one month, and if the discharge occurs during only one day in that period then the permittee must sample on that day and report the results of analyses accordingly.

### **1.3.3. Test Procedures**

- a. Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304 (h) of the Clean Water Act (the "Act"), as amended, under which such procedures may be required.
- b. Unless otherwise noted in the permit, all pollutant parameters shall be determined according to methods prescribed in Title 40, CFR, Part 136, as amended, promulgated pursuant to Section 304 (h) of the Act.

- c. Composite samples must be proportioned by flow at time of sampling. Aliquots may be collected manually or automatically. The sample aliquots must be maintained at  $\leq 6$  degrees Celsius during the compositing period.
- d. In instances where permit limits established through implementation of applicable water criteria are below analytical capabilities, compliance with those limits will be determined using the detection limits described in the TN Rules, Chapter 0400-40-03-.05(8).
- e. **All sampling for total mercury at the municipal wastewater plant (application, pretreatment, etc.) shall use Methods 1631, 245.7 or any additional method in 40 CFR 136 with a maximum detection limit of 5 ng/L.**

#### **1.3.4. Recording of Results**

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a. The exact place, date and time of sampling;
- b. The exact person(s) collecting samples;
- c. The dates and times the analyses were performed;
- d. The person(s) or laboratory who performed the analyses;
- e. The analytical techniques or methods used, and;
- f. The results of all required analyses.

#### **1.3.5. Records Retention**

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation shall be retained for a minimum of three (3) years, or longer, if requested by the Division of Water Resources.

### **1.4. REPORTING**

#### **1.4.1. Monitoring Results**

Monitoring results shall be recorded monthly and submitted monthly using Discharge Monitoring Report (DMR) forms supplied by the Division of Water Resources. Submittals shall be postmarked no later than 15 days after the completion of the reporting period. A completed DMR with an original signature shall be submitted to the following address:



**STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF WATER RESOURCES  
COMPLIANCE & ENFORCEMENT SECTION  
William R. Snodgrass - Tennessee Tower  
312 Rosa L. Parks Avenue, 11th Floor  
Nashville, Tennessee 37243-1102**

A copy of the completed and signed DMR shall be mailed to the Nashville Environmental Field Office (EFO) at the following address:

**STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF WATER RESOURCES  
Nashville Environmental Field Office  
711 R.S. Gass Boulevard  
Nashville, Tennessee 37216**

A copy should be retained for the permittee's files. In addition, any communication regarding compliance with the conditions of this permit must be sent to the two offices listed above.

The first DMR is due on the 15th of the month following permit effectiveness.

DMRs and any other information or report must be signed and certified by a responsible corporate officer as defined in 40 CFR 122.22, a general partner or proprietor, or a principal municipal executive officer or ranking elected official, or his duly authorized representative. Such authorization must be submitted in writing and must explain the duties and responsibilities of the authorized representative.

The electronic submission of DMR data will be accepted only if formally approved beforehand by the division. For purposes of determining compliance with this permit, data approved by the division to be submitted electronically is legally equivalent to data submitted on signed and certified DMR forms.

**1.4.2. Additional Monitoring by Permittee**

If the permittee monitors any pollutant specifically limited by this permit more frequently than required at the location(s) designated, using approved analytical methods as specified herein, the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form. Such increased frequency shall also be indicated on the form.

**1.4.3. Falsifying Results and/or Reports**

Knowingly making any false statement on any report required by this permit or falsifying any result may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

#### **1.4.4. Monthly Report of Operation**

Monthly operational reports shall be submitted on standard forms to the appropriate Division of Water Resources Environmental Field Office in Jackson, Nashville, Chattanooga, Columbia, Cookeville, Memphis, Johnson City, or Knoxville. Reports shall be submitted by the 15th day of the month following data collection.

#### **1.4.5. Bypass and Overflow Reporting**

##### **1.3.5.1. Report Requirements**

A summary report of known or suspected instances of overflows in the collection system or bypass of wastewater treatment facilities shall accompany the Discharge Monitoring Report. The report must contain the date and duration of the instances of overflow and/or bypassing and the estimated quantity of wastewater released and/or bypassed.

The report must also detail activities undertaken during the reporting period to (1) determine if overflow is occurring in the collection system, (2) correct those known or suspected overflow points and (3) prevent future or possible overflows and any resulting bypassing at the treatment facility.

On the DMR, the permittee must report the number of sanitary sewer overflows, dry-weather overflows and in-plant bypasses separately. Three lines must be used on the DMR form, one for sanitary sewer overflows, one for dry-weather overflows and one for in-plant bypasses.

##### **1.3.5.2. Anticipated Bypass Notification**

If, because of unavoidable maintenance or construction, the permittee has need to create an in-plant bypass which would cause an effluent violation, the permittee must notify the division as soon as possible, but in any case, no later than 10 days prior to the date of the bypass.

#### **1.4.6. Reporting Less Than Detection**

A permit limit may be less than the accepted detection level. If the samples are below the detection level, then report “BDL” or “NODI =B” on the DMRs. The permittee must use the correct detection levels in all analytical testing required in the permit. The required detection levels are listed in the Rules of the Department of Environment and Conservation, Division of Water Resources, Chapter 0400-40-03-.05(8).

For example, if the limit is 0.02 mg/l with a detection level of 0.05 mg/l and detection is shown; 0.05 mg/l must be reported. In contrast, if nothing is detected reporting “BDL” or “NODI =B” is acceptable.

**1.5. COMPLIANCE WITH SECTION 208**

The limits and conditions in this permit shall require compliance with an area-wide waste treatment plan (208 Water Quality Management Plan) where such approved plan is applicable.

**1.6. REOPENER CLAUSE**

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 307(a)(2) and 405(d)(2)(D) of the Clean Water Act, as amended, if the effluent standard, limitation or sludge disposal requirement so issued or approved:

- a. Contains different conditions or is otherwise more stringent than any condition in the permit; or
- b. Controls any pollutant or disposal method not addressed in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

This permit may be reopened and modified by either the permittee or the State of Tennessee, subject to the right to comment and appeal and all other applicable public notice procedures, to incorporate changes necessary to accommodate watershed planning requirements associated with total maximum daily load (TMDL) development or other pollutant reduction strategy or to incorporate changes based on new information in conformance with provisions of the anti-backsliding regulation regarding, but not limited to nitrogen and phosphorus.

**1.7. SCHEDULE OF COMPLIANCE**

Full compliance and operational levels shall be attained from the effective date of this permit.

## **2.0. GENERAL PERMIT REQUIREMENTS**

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### **2.1. GENERAL PROVISIONS**

#### **2.1.1. Duty to Reapply**

Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of the Division of Water Resources (the "director") no later than 180 days prior to the expiration date. Such forms shall be properly signed and certified.

#### **2.1.2. Right of Entry**

The permittee shall allow the director, the Regional Administrator of the U.S. Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials:

- a. To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;
- b. To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and
- c. To sample at reasonable times any discharge of pollutants.

#### **2.1.3. Availability of Reports**

Except for data determined to be confidential under Section 308 of the Federal Water Pollution Control Act, as amended, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Water Resources. As required by the Federal Act, effluent data shall not be considered confidential.

**2.1.4. Proper Operation and Maintenance**

- a. The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.
- b. Dilution water shall not be added to comply with effluent requirements to achieve BCT, BPT, BAT and or other technology based effluent limitations such as those in State of Tennessee Rule 0400-40-05-.09.

**2.1.5. Treatment Facility Failure (Industrial Sources)**

The permittee, in order to maintain compliance with this permit, shall control production, all discharges, or both, upon reduction, loss, or failure of the treatment facility, until the facility is restored or an alternative method of treatment is provided. This requirement applies in such situations as the reduction, loss, or failure of the primary source of power.

**2.1.6. Property Rights**

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

**2.1.7. Severability**

The provisions of this permit are severable. If any provision of this permit due to any circumstance, is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

**2.1.8. Other Information**

If the permittee becomes aware of failure to submit any relevant facts in a permit application, or of submission of incorrect information in a permit application or in any report to the director, then the permittee shall promptly submit such facts or information.

## **2.2. CHANGES AFFECTING THE PERMIT**

### **2.2.1. Planned Changes**

The permittee shall give notice to the director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

- a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
- b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants, which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

### **2.2.2. Permit Modification, Revocation, or Termination**

- a. This permit may be modified, revoked and reissued, or terminated for cause as described in 40 CFR 122.62 and 122.64, Federal Register, Volume 49, No. 188 (Wednesday, September 26, 1984), as amended.
- b. The permittee shall furnish to the director, within a reasonable time, any information which the director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the director, upon request, copies of records required to be kept by this permit.
- c. If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for any toxic pollutant under Section 307(a) of the Federal Water Pollution Control Act, as amended, the director shall modify or revoke and reissue the permit to conform to the prohibition or to the effluent standard, providing that the effluent standard is more stringent than the limitation in the permit on the toxic pollutant. The permittee shall comply with these effluent standards or prohibitions within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified or revoked and reissued to incorporate the requirement.
- d. The filing of a request by the permittee for a modification, revocation, reissuance, termination, or notification of planned changes or anticipated noncompliance does not halt any permit condition.

### **2.2.3. Change of Ownership**

This permit may be transferred to another party (provided there are neither modifications to the facility or its operations, nor any other changes which might affect the permit limits and conditions contained in the permit) by the permittee if:

- a. The permittee notifies the director of the proposed transfer at least 30 days in advance of the proposed transfer date;
- b. The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and liability between them; and
- c. The director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

Pursuant to the requirements of 40 CFR 122.61, concerning transfer of ownership, the permittee must provide the following information to the division in their formal notice of intent to transfer ownership: 1) the NPDES permit number of the subject permit; 2) the effective date of the proposed transfer; 3) the name and address of the transferor; 4) the name and address of the transferee; 5) the names of the responsible parties for both the transferor and transferee; 6) a statement that the transferee assumes responsibility for the subject NPDES permit; 7) a statement that the transferor relinquishes responsibility for the subject NPDES permit; 8) the signatures of the responsible parties for both the transferor and transferee pursuant to the requirements of 40 CFR 122.22(a), "Signatories to permit applications"; and, 9) a statement regarding any proposed modifications to the facility, its operations, or any other changes which might affect the permit limits and conditions contained in the permit.

#### **2.2.4. Change of Mailing Address**

The permittee shall promptly provide to the director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

### **2.3. NONCOMPLIANCE**

#### **2.3.1. Effect of Noncompliance**

All discharges shall be consistent with the terms and conditions of this permit. Any permit noncompliance constitutes a violation of applicable state and federal laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

#### **2.3.2. Reporting of Noncompliance**

- a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to

the Division of Water Resources in the appropriate Environmental Field Office within 24-hours from the time the permittee becomes aware of the circumstances. (The Environmental Field Office should be contacted for names and phone numbers of environmental response team).

A written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless the director on a case-by-case basis waives this requirement. The permittee shall provide the director with the following information:

- i. A description of the discharge and cause of noncompliance;
  - ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
  - iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.
- b. Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph 2.3.2.a above, the permittee shall report the noncompliance on the Discharge Monitoring Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

### **2.3.3. Overflow**

- a. **"Overflow"** means any release of sewage from any portion of the collection, transmission, or treatment system other than through permitted outfalls.
- b. Overflows are prohibited.
- c. The permittee shall operate the collection system so as to avoid overflows.
- d. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic overflows (greater than 5 events per year) or would otherwise overload any portion of the system. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic overflow point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to a Monthly Operating Report



submitted to the local TDEC Environmental Field Office. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.

- e. In the event that more than 5 overflows have occurred from a single point in the collection system for reasons that may not warrant the self-imposed moratorium or completion of the actions identified in this paragraph, the permittee may request a meeting with the Division of Water Resources EFO staff to petition for a waiver based on mitigating evidence.

#### **2.3.4. Upset**

- a. "**Upset**" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- b. An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:
  - i. An upset occurred and that the permittee can identify the cause(s) of the upset;
  - ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;
  - iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and
  - iv. The permittee complied with any remedial measures required under "Adverse Impact."

#### **2.3.5. Adverse Impact**

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

### 2.3.6. Bypass

- a. "**Bypass**" is the intentional diversion of waste streams from any portion of a treatment facility. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- b. Bypasses are prohibited unless all of the following 3 conditions are met:
  - i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;
  - ii. There are no feasible alternatives to bypass, such as the construction and use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass, which occurred during normal periods of equipment downtime or preventative maintenance;
  - iii. The permittee submits notice of an unanticipated bypass to the Division of Water Resources in the appropriate Environmental Field Office within 24 hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). When the need for the bypass is foreseeable, prior notification shall be submitted to the director, if possible, at least 10 days before the date of the bypass.
- c. Bypasses not exceeding permit limitations are allowed **only** if the bypass is necessary for essential maintenance to assure efficient operation. All other bypasses are prohibited. Allowable bypasses not exceeding limitations are not subject to the reporting requirements of 2.3.6.b.iii, above.

### 2.3.7. Washout

- a. For domestic wastewater plants only, a "washout" shall be defined as loss of Mixed Liquor Suspended Solids (MLSS) of 30.00% or more. This refers to the MLSS in the aeration basin(s) only. This does not include MLSS decrease due to solids wasting to the sludge disposal system. A washout can be caused by improper operation or from peak flows due to infiltration and inflow.
- b. A washout is prohibited. If a washout occurs the permittee must report the incident to the Division of Water Resources in the appropriate Environmental Field Office within 24 hours by telephone. A written submission must be provided within five days. The washout must be noted on the discharge monitoring report. Each day of a washout is a separate violation.

## **2.4. LIABILITIES**

### **2.4.1. Civil and Criminal Liability**

Except as provided in permit conditions for "***Bypassing***," "***Overflow***," and "***Upset***," nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

### **2.4.2. Liability Under State Law**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or the Federal Water Pollution Control Act, as amended.

## **3.0. PERMIT SPECIFIC REQUIREMENTS**

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### **3.1. CERTIFIED OPERATOR**

The waste treatment facilities shall be operated under the supervision of a Grade 4 certified wastewater treatment operator and the collection system shall be operated under the supervision of a Grade 2 certified collection system operator in accordance with the Water Environmental Health Act of 1984.

### **3.2. POTW PRETREATMENT PROGRAM GENERAL PROVISIONS**

As an update of information previously submitted to the division, the permittee will undertake the following activity.

- a. The permittee has been delegated the primary responsibility and therefore becomes the "control authority" for enforcing the 40 CFR 403 General Pretreatment Regulations. Where multiple plants are concerned the permittee is responsible for the Pretreatment Program for all plants within its jurisdiction. The permittee shall implement and enforce the Industrial Pretreatment Program in accordance with Section 403(b)(8) of the Clean Water Act, the Federal Pretreatment Regulations 40 CFR 403, Tennessee Water Quality Control Act Part 69-3-123 through 69-3-128, and the legal authorities, policies, procedures, and financial provisions contained in its approved Pretreatment Program, except

to the extent this permit imposed stricter requirements. Such implementation shall require but not limit the permittee to do the following:

- i. Carry out inspection, surveillance, and monitoring procedures which will determine, independent of information supplied by the industrial user (IU), whether the IU is in compliance with the pretreatment standards;
  - ii. Require development, as necessary, of compliance schedules for each IU for the installation of control technologies to meet applicable pretreatment standards;
  - iii. Require all industrial users to comply with all applicable monitoring and reporting requirements outlined in the approved pretreatment program and IU permit;
  - iv. Maintain and update, as necessary, records identifying the nature and character of industrial user discharges, and retain such records for a minimum of three (3) years;
  - v. Obtain appropriate remedies for noncompliance by an IU with any pretreatment standard and/or requirement;
  - vi. Publish annually, pursuant to 40 CFR 403.8 (f)(2)(viii), a list of industrial users that have significantly violated pretreatment requirements and standards during the previous twelve-month period.
  - vii. Maintain an adequate revenue structure for continued operation of the pretreatment program.
  - viii. Update its Industrial Waste Survey at least once every five years. Results of this update shall be submitted to the Division of Water Resources, Pretreatment Section within 120 days of the effective date of this permit, unless such a survey has been submitted within 3 years of the effective date.
  - ix. Submit a written technical evaluation of the need to revise local limits within 120 days of the effective date of this permit to the state pretreatment program coordinator. The evaluation shall include the most recent pass-through limits proposed by the division. The technical evaluation shall be based on practical and specialized knowledge of the local program and not be limited by a specified written format.
- b. The permittee shall enforce 40 CFR 403.5, "prohibited discharges". Pollutants introduced into the POTW by a non-domestic source shall not cause pass through or interference as defined in 40 CFR Part 403.3. These general prohibitions and the specific prohibitions in this section apply to all non-domestic sources introducing pollutants into the POTW whether the source is subject to other National Pretreatment Standards or any state or local pretreatment requirements.

Specific prohibitions. Under no circumstances shall the permittee allow introduction of the following wastes in the waste treatment system:

- i. Pollutants which create a fire or explosion hazard in the POTW;
  - ii. Pollutants which will cause corrosive structural damage to the treatment works, but in no case discharges with pH less than 5.0 unless the system is specifically designed to accept such discharges.
  - iii. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the treatment system resulting in interference.
  - iv. Any pollutant, including oxygen-demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the treatment works.
  - v. Heat in amounts which will inhibit biological activity in the treatment works resulting in interference, but in no case heat in such quantities that the temperature at the treatment works exceeds 40°C (104°F) unless the works are designed to accommodate such heat.
  - vi. Any priority pollutant in amounts that will contaminate the treatment works sludge.
  - vii. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;
  - viii. Pollutants which result in the presence of toxic gases, vapors or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
  - ix. Any trucked or hauled pollutants except at discharge points designated by the POTW.
- c. The permittee shall notify the Tennessee Division of Water Resources of any of the following changes in user discharge to the system no later than 30 days prior to change of discharge:
- i. New introductions into such works of pollutants from any source which would be a new source as defined in Section 306 of the Act if such source were discharging pollutants.
  - ii. New introductions of pollutants into such works from a source which would be subject to Section 301 of the "Federal Water Quality Act as Amended" if it were discharging such pollutants.
  - iii. A substantial change in volume or character of pollutants being introduced into such works by a source already discharging pollutants into such works at the time the permit is issued.

This notice will include information on the quantity and quality of the wastewater introduced by the new source into the publicly owned treatment works, and on any anticipated impact on the effluent discharged from such works. If this discharge necessitates a revision of the current NPDES permit or pass-through guidelines, discharge by this source is prohibited until the Tennessee Division of Water Resources gives final authorization.

d. Reporting Requirements

The permittee shall provide a semiannual report briefly describing the permittee's pretreatment program activities over the previous six-month period. Reporting periods shall end on the last day of the months of March and September. The report shall be submitted to the Division of Water Resources, Central Office and a copy to the appropriate Environmental Field Office no later than the 28th day of the month following each reporting period. For control authorities with multiple STPs, one report should be submitted with a separate Form 1 for each STP. Each report shall conform to the format set forth in the State POTW Pretreatment Semiannual Report Package which contains information regarding:

- i. An updated listing of the permittee's industrial users.
- ii. Results of sampling of the influent and effluent of the wastewater treatment plant. At least once each reporting period, the permittee shall analyze the wastewater treatment plant influent and effluent for the following pollutants, using the prescribed sampling procedures:

Pollutant	Sample Type
chromium, trivalent	24-hour composite
chromium, hexavalent	24-hour composite
copper	24-hour composite
lead	24-hour composite
nickel	24-hour composite
zinc	24-hour composite
cadmium	24-hour composite
mercury	24-hour composite
silver	24-hour composite
total phenols	grab
cyanide	grab

If any particular pollutant is analyzed more frequently than is required, the permittee shall report the maximum and average values on the semiannual report. All upsets, interferences, and pass-through violations must also be reported on the semiannual report, the actions that were taken to determine the

causes of the incidents and the steps that have been taken to prevent the incidents from recurring.

At least once during the term of this permit, the permittee shall analyze the effluent from the STP (and report the results in the next regularly scheduled report) for the following pollutants:

chromium III	cyanide	phthalates, sum of the following: bis (2-ethylhexyl) phthalate butyl benzylphthalate di-n-butylphthalate diethyl phthalate
chromium VI	silver	
copper	benzene	
lead	carbon tetrachloride	
nickel	chloroform	
zinc	ethylbenzene	1,2 trans-dichloroethylene
cadmium	methylene chloride	tetrachloroethylene
mercury	naphthalene	toluene
phenols, total	1,1,1 trichloroethane	trichloroethylene

- iii. Compliance with categorical and local standards, and review of industrial compliance, which includes a summary of the compliance status for all permitted industries. Also included is information on the number and type of major violations of pretreatment regulations, and the actions taken by the POTW to obtain compliance. The effluent from all significant industrial users must be analyzed for the appropriate pollutants at least once every 12 months.
- iv. A list of industries in significant non-compliance as published in local newspapers in accordance with the requirements set forth in 40 CFR 403.8(f)(2)(viii).
- v. A description of all substantive changes made to the permittee's pretreatment program. Any such changes shall receive prior approval. Substantive changes include, but are not limited to, any change in any ordinance, major modification in the program's administrative structure, local limits, or a change in the method of funding the program.
- vi. Summary of permittee's industrial user inspections, which includes information on the number and type of industry inspected. All significant industrial users must be inspected at least once per year.

### 3.3. BIOSOLIDS MANAGEMENT PRACTICES

All sludge and/or biosolids use or disposal must comply with 40 CFR 503 et seq. Biosolids shall be sampled and analyzed at a frequency dependent on the amount used annually.

Any facility that land applies non-exceptional quality biosolids must obtain an appropriate permit from the division in accordance with Chapter 0400-40-15.

- a. Reopener: If an applicable "acceptable management practice" or numerical limitation for pollutants in sewage sludge promulgated under Section 405(d)(2) of the Clean Water Act, as amended by the Water Quality Act of 1987, is more stringent than the sludge pollutant limit or acceptable management practice in this permit, or controls a pollutant not limited in this permit, this permit shall be promptly modified or revoked and reissued to conform to the requirements promulgated under Section 405(d)(2). The permittee shall comply with the limitations by no later than the compliance deadline specified in the applicable regulations as required by Section 405(d)(2) of the Clean Water Act.
- b. Notice of change in sludge disposal practice: The permittee shall give prior notice to the director of any change planned in the permittee's sludge disposal practice. The current method of sludge disposal is to a municipal solid waste landfill (or co - composting facility). This method of disposal is controlled by the rules of the Tennessee Division of Solid Waste Management (DSWM) and Federal Regulations at 40 CFR 258. If the permittee anticipates changing its disposal practices to either land application or surface disposal, the Division of Water Resources shall be notified prior to the change. A copy of the results of pollutant analyses required by the Tennessee Division of Solid Waste Management (DSWM) and / or 40 CFR 258 shall be submitted to the Division of Water Resources.

### 3.4. BIOMONITORING REQUIREMENTS, CHRONIC

The permittee shall conduct a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow (*Pimephales promelas*) Larval Survival and Growth Test on samples of final effluent from Outfall 001.

The measured endpoint for toxicity will be the inhibition concentration causing 25% reduction in survival, reproduction and growth (IC<sub>25</sub>) of the test organisms. The IC<sub>25</sub> shall be determined based on a 25% reduction as compared to the controls, and as derived from linear interpolation. The average reproduction and growth responses will be determined based on the number of *Ceriodaphnia dubia* or *Pimephales promelas* larvae used to initiate the test.

Test shall be conducted and its results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:



**16 MGD Design Biomonitoring Serial Dilutions**

<b>Summer Limits - Serial Dilutions for Whole Effluent Toxicity (WET) Testing</b>					
<b>100% Effluent</b>	<b>Permit Limit (PL)</b>	<b>0.50 X PL</b>	<b>0.25 X PL</b>	<b>0.125 X PL</b>	<b>Control</b>
<b>% effluent</b>					
<b>100</b>	<b>99</b>	<b>49.5</b>	<b>24.75</b>	<b>12.375</b>	<b>0</b>

<b>Winter Limits - Serial Dilutions for Whole Effluent Toxicity (WET) Testing</b>					
<b>100% Effluent</b>	<b>(100+PL)/2</b>	<b>Permit Limit (PL)</b>	<b>0.50 X PL</b>	<b>0.25 X PL</b>	<b>Control</b>
<b>% effluent</b>					
<b>100</b>	<b>87</b>	<b>74</b>	<b>37</b>	<b>18.5</b>	<b>0</b>

**20 MGD Design Biomonitoring Serial Dilutions**

<b>Summer Limits - Serial Dilutions for Whole Effluent Toxicity (WET) Testing</b>					
<b>100% Effluent</b>	<b>Permit Limit (PL)</b>	<b>0.50 X PL</b>	<b>0.25 X PL</b>	<b>0.125 X PL</b>	<b>Control</b>
<b>% effluent</b>					
<b>100</b>	<b>99</b>	<b>49.5</b>	<b>24.75</b>	<b>12.375</b>	<b>0</b>

<b>Winter Limits - Serial Dilutions for Whole Effluent Toxicity (WET) Testing</b>					
<b>100% Effluent</b>	<b>(100+PL)/2</b>	<b>Permit Limit (PL)</b>	<b>0.50 X PL</b>	<b>0.25 X PL</b>	<b>Control</b>
<b>% effluent</b>					
<b>100</b>	<b>89</b>	<b>78</b>	<b>39</b>	<b>19.5</b>	<b>0</b>

The dilution/control water used will be moderately hard water as described in [Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms](#), EPA-821-R-02-013 (or the most current edition). A chronic standard reference toxicant quality assurance test shall be conducted with each species used in the toxicity tests and the results submitted with the discharge monitoring report. Additionally, the analysis of this multi-concentration test shall include review of the concentration-response relationship to ensure that calculated test results are interpreted appropriately.

Toxicity will be demonstrated if the IC<sub>25</sub> is less than or equal to the permit limit indicated for each outfall in the above table(s). Toxicity demonstrated by the tests specified herein constitutes a violation of this permit.

All tests will be conducted using a minimum of three 24-hour flow-proportionate composite samples of final effluent collected on days 1, 3 and 5. If, in any control more than 20% of the test organisms die in 7 days, the test (control and effluent) is considered invalid and the test shall be repeated within two (2) weeks. Furthermore, if the results do not meet the acceptability criteria in [Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms](#), EPA-821-R-02-013 (or the most current edition), **or if the required concentration-response review fails to yield a valid relationship per guidance contained in [Method Guidance and Recommendations for Whole Effluent Toxicity \(WET\) Testing](#), EPA-821-B-00-004 (or the most current edition)**, that test shall be repeated. Any test initiated but terminated before completion must also be reported along with a complete explanation for the termination.

**In the event of a test failure**, the permittee must start a follow-up test within 2 weeks and submit results from a follow-up test within 30 days from obtaining initial WET testing results. The follow-up test must be conducted using the same serial dilutions as presented in the corresponding table(s) above. **The follow-up test will not negate an initial failed test. In addition, the failure of a follow-up test will constitute a separate permit violation.**

In the event of 2 consecutive test failures or 3 test failures within a 12-month period for the same outfall, the permittee must initiate a Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE) study within 30 days and so notify the division by letter. This notification shall include a schedule of activities for the initial investigation of that outfall. **During the term of the TIE/TRE study, the frequency of biomonitoring shall be once every three months.** Additionally, the permittee shall submit progress reports once every three months throughout the term of the TIE/TRE study. The toxicity must be reduced to allowable limits for that outfall within 2 years of initiation of the TIE/TRE study. Subsequent to the results obtained from the TIE/TRE studies, the permittee may request an extension of the TIE/TRE study period if necessary to conduct further analyses. The final determination of any extension period will be made at the discretion of the division.

The TIE/TRE study may be terminated at any time upon the completion and submission of 2 consecutive tests (for the same outfall) demonstrating compliance. Following the completion of TIE/TRE study, the frequency of monitoring will return to a regular schedule, as defined previously in this section as well in Part I of the permit. **During the course of the TIE/TRE study, the permittee will continue to conduct toxicity testing of the outfall being investigated at the frequency of once every three months but will not be required to perform follow-up tests for that outfall during the period of TIE/TRE study.**

Test procedures, quality assurance practices, determinations of effluent survival/reproduction and survival/growth values, and report formats will be made in accordance with [Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms](#), EPA-821-R-02-013, or the most current edition.

Results of all tests, reference toxicant information, copies of raw data sheets, statistical analysis and chemical analyses shall be compiled in a report. The report will be written in accordance with [Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms](#), EPA-821-R-02-013, or the most current edition.

Two copies of biomonitoring reports (including follow-up reports) shall be submitted to the division. One copy of the report shall be submitted along with the discharge monitoring report (DMR). The second copy shall be submitted to the local Division of Water Resources office address (see table below):

Division of Water Resources			
Office	Location	Zip Code	Phone No.
Chattanooga	540 McCallie Avenue, Suite 550	37402-2013	(423) 634-5745
Jackson	1625 Hollywood Drive	38305	(731) 512-1300
Cookeville	1221 South Willow Avenue	38506	(931) 432-4015
Columbia	2484 Park Plus Drive	38401	(931) 380-3371
Johnson City	2305 Silverdale Road	37601	(423) 854-5400
Knoxville	3711 Middlebrook Pike	37921	(865) 594-6035
Memphis	8383 Wolf Lake Drive, Bartlett	38133-4119	(901) 371-3000
Nashville	711 R.S. Gass Boulevard	37243-1550	(615) 687-7000

### 3.5. PLACEMENT OF SIGNS

Within sixty (60) days of the effective date of this permit, the permittee shall place and maintain a sign(s) at each outfall and any bypass/overflow point in the collection system. For the purposes of this requirement, any bypass/overflow point that has discharged five (5) or more times in the last year must be so posted. The sign(s) should be clearly visible to the public from the bank and the receiving stream. The minimum sign size should be two feet by two feet (2' x 2') with one-inch (1") letters. The sign should be made of durable material and have a white background with black letters.

The sign(s) are to provide notice to the public as to the nature of the discharge and, in the case of the permitted outfalls, that the discharge is regulated by the Tennessee Department of Environment and Conservation, Division of Water Resources. The following is given as an example of the minimal amount of information that must be included on the sign:

Permitted CSO or unpermitted bypass/overflow point:

**UNTREATED WASTEWATER DISCHARGE POINT**  
**Murfreesboro-Sinking Creek STP**  
**(615) 848-3209**  
**NPDES Permit NO. TN0022586**  
**TENNESSEE DIVISION OF WATER RESOURCES**  
**1-888-891-8332 ENVIRONMENTAL FIELD OFFICE - Nashville**

**NPDES Permitted Municipal/Sanitary Outfall:**

**TREATED MUNICIPAL/SANITARY WASTEWATER**  
**Murfreesboro-Sinking Creek STP**  
**(615) 848-3209**  
**NPDES Permit NO. TN0022586**  
**TENNESSEE DIVISION OF WATER RESOURCES**  
**1-888-891-8332 ENVIRONMENTAL FIELD OFFICE - Nashville**

No later than sixty (60) days from the effective date of this permit, the permittee shall have the above sign(s) on display in the location specified.

**3.6. ANTIDegradation**

Pursuant to the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06, titled "Tennessee Antidegradation Statement," which prohibits the degradation of exceptional Tennessee waters and the increased discharges of substances that cause or contribute to impairment, the permittee shall further be required, pursuant to the terms and conditions of this permit, to comply with the effluent limitations and schedules of compliance required to implement applicable water quality standards, to comply with a State Water Quality Plan or other state or federal laws or regulations, or where practicable, to comply with a standard permitting no discharge of pollutants.

**3.7. TREATED WATER REUSE**

This permit allows treated wastewater effluent to be distributed for land application reuse by industrial customers, commercial developments, golf courses, recreational areas, residential developments and other non-potable uses. The reuse water must receive all treatment steps applied to the discharged wastewater and must comply with all effluent limitations applied to the discharge wastewater. In addition, the reuse wastewater must comply with the numeric limitations in Section 1.2 and the following requirements:

Reuse activities are restricted to use of the water in a manner that results in its disposal by land application (spray irrigation or drip irrigation). No discharge of the reuse water is allowed. The application rate when spray or drip irrigation is employed shall be restricted such that there shall be no ponding or runoff of the reuse water. Dedicated irrigation sites shall be owned by the permittee (or covered by a perpetual easement for use as a land application site) and approved by the division prior to their use for irrigation purposes.

In order to protect public health, this permit requires that the permittee meet a daily maximum E. coli concentration of 23 colonies per 100 ml and a daily minimum chlorine residual of 1.0 mg/l in the distribution system.

The permittee shall take appropriate measures, including signs, tags, permanently imprinted warnings, etc., to insure that all points where water can be accessed from the reuse distribution system are clearly marked to indicate that the reuse water is unfit for drinking or other potable purposes.

## 4.0. DEFINITIONS AND ACRONYMS

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### 4.1. DEFINITIONS

“**Biosolids**” are treated sewage sludge that have contaminant concentrations less than or equal to the contaminant concentrations listed in Table 1 of subparagraph (3)(b) of Rule 0400-40-15-.02, meet any one of the ten vector attraction reduction options listed in part (4)(b)1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 of Rule 0400-40-15-.04, and meet either one of the six pathogen reduction alternatives for Class A listed in part (3)(a)3, 4, 5, 6, 7, or 8, or one of the three pathogen reduction alternatives for Class B listed in part (3)(b)2, 3, or 4 of Rule 0400- 40-15-.04.

A “**bypass**” is defined as the intentional diversion of waste streams from any portion of a treatment facility.

A “**calendar day**” is defined as the 24-hour period from midnight to midnight or any other 24-hour period that reasonably approximates the midnight to midnight time period.

A “**composite sample**” is a combination of not less than 8 influent or effluent portions, of at least 100 ml, collected over a 24-hour period. Under certain circumstances a lesser time period may be allowed, but in no case, less than 8 hours.

The “**daily maximum concentration**” is a limitation on the average concentration in units of mass per volume (e.g. milligrams per liter), of the discharge during any calendar day. When a proportional-to-flow composite sampling device is used, the daily concentration is the concentration of that 24-hour composite; when other sampling means are used, the daily concentration is the arithmetic mean of the concentrations of equal volume samples collected during any calendar day or sampling period.

“**Discharge**” or “discharge of a pollutant” refers to the addition of pollutants to waters from a source.

A “**dry weather overflow**” is a type of sanitary sewer overflow and is defined as one day or any portion of a day in which unpermitted discharge of wastewater from the collection or treatment system other than through the permitted outfall occurs and is not directly related to a rainfall event. Discharges from more than one point within a 24-hour period shall be counted as separate overflows.

“**Degradation**” means the alteration of the properties of waters by the addition of pollutants, withdrawal of water, or removal of habitat, except those alterations of a short duration.

“**De Minimis**” - Degradation of a small magnitude, as provided in this paragraph.

(a) Discharges and withdrawals

1. Subject to the limitation in part 3 of this subparagraph, a single discharge other than those from new domestic wastewater sources will be considered de minimis if it uses less than five percent of the available assimilative capacity for the substance being discharged.
2. Subject to the limitation in part 3 of this subparagraph, a single water withdrawal will be considered de minimis if it removes less than five percent of the 7Q10 flow of the stream.
3. If more than one activity described in part 1 or 2 of this subparagraph has been authorized in a segment and the total of the authorized and proposed impacts uses no more than 10% of the assimilative capacity, or 7Q10 low flow, they are presumed to be de minimis. Where the total of the authorized and proposed impacts uses 10% of the assimilative capacity, or 7Q10 low flow, additional degradation may only be treated as de minimis if the Division finds on a scientific basis that the additional degradation has an insignificant effect on the resource.

(b) Habitat alterations authorized by an Aquatic Resource Alteration Permit (ARAP) are de minimis if the Division finds that the impacts, individually and cumulatively are offset by impact minimization and/or in-system mitigation, provided however, in ONRWs the mitigation must occur within the ONRW.

An “**ecoregion**” is a relatively homogeneous area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables.

The “**geometric mean**” of any set of values is the  $n^{\text{th}}$  root of the product of the individual values where “n” is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For the purposes of calculating the geometric mean, values of zero (0) shall be considered to be one (1).

A “**grab sample**” is a single influent or effluent sample collected at a particular time.

The "**instantaneous maximum concentration**" is a limitation on the concentration, in milligrams per liter, of any pollutant contained in the wastewater discharge determined from a grab sample taken from the discharge at any point in time.

The "**instantaneous minimum concentration**" is the minimum allowable concentration, in milligrams per liter, of a pollutant parameter contained in the wastewater discharge determined from a grab sample taken from the discharge at any point in time.

The "**monthly average amount**", shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

The "**monthly average concentration**", other than for *E. coli* bacteria, is the arithmetic mean of all the composite or grab samples collected in a one-calendar month period.

A "**one week period**" (or "**calendar-week**") is defined as the period from Sunday through Saturday. For reporting purposes, a calendar week that contains a change of month shall be considered part of the latter month.

"**Pollutant**" means sewage, industrial wastes, or other wastes.

A "**quarter**" is defined as any one of the following three-month periods: January 1 through March 31, April 1 through June 30, July 1 through September 30, and/or October 1 through December 31.

A "**rainfall event**" is defined as any occurrence of rain, preceded by 10 hours without precipitation that results in an accumulation of 0.01 inches or more. Instances of rainfall occurring within 10 hours of each other will be considered a single rainfall event.

A "**rationale**" (or "fact sheet") is a document that is prepared when drafting an NPDES permit or permit action. It provides the technical, regulatory and administrative basis for an agency's permit decision.

A "**reference site**" means least impacted waters within an ecoregion that have been monitored to establish a baseline to which alterations of other waters can be compared.

A "**reference condition**" is a parameter-specific set of data from regional reference sites that establish the statistical range of values for that particular substance at least-impacted streams.

A "**sanitary sewer overflow (SSO)**" is defined as an unpermitted discharge of wastewater from the collection or treatment system other than through the permitted outfall.

**“Sewage”** means water-carried waste or discharges from human beings or animals, from residences, public or private buildings, or industrial establishments, or boats, together with such other wastes and ground, surface, storm, or other water as may be present.

**“Severe property damage”** when used to consider the allowance of a bypass or SSO means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass or SSO. Severe property damage does not mean economic loss caused by delays in production.

**“Sewerage system”** means the conduits, sewers, and all devices and appurtenances by means of which sewage and other waste is collected, pumped, treated, or disposed.

**“Sludge”** or **“sewage sludge”** is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works.

A **“subecoregion”** is a smaller, more homogenous area that has been delineated within an ecoregion.

**“Upset”** means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

The term, **“washout”** is applicable to activated sludge plants and is defined as loss of mixed liquor suspended solids (MLSS) of 30.00% or more from the aeration basin(s).

**“Waters”** means any and all water, public or private, on or beneath the surface of the ground, which are contained within, flow through, or border upon Tennessee or any portion thereof except those bodies of water confined to and retained within the limits of private property in single ownership which do not combine or effect a junction with natural surface or underground waters.

The **“weekly average amount”**, shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar week when the measurements were made.



The "**weekly average concentration**", is the arithmetic mean of all the composite samples collected in a one-week period. The permittee must report the highest weekly average in the one-month period.

#### 4.2. ACRONYMS AND ABBREVIATIONS

1Q10 – 1-day minimum, 10-year recurrence interval

30Q20 – 30-day minimum, 20-year recurrence interval

7Q10 – 7-day minimum, 10-year recurrence interval

BAT – best available technology economically achievable

BCT – best conventional pollutant control technology

BDL – below detection level

BOD<sub>5</sub> – five day biochemical oxygen demand

BPT – best practicable control technology currently available

CBOD<sub>5</sub> – five day carbonaceous biochemical oxygen demand

CEI – compliance evaluation inspection

CFR – code of federal regulations

CFS – cubic feet per second

CFU – colony forming units

CIU – categorical industrial user

CSO – combined sewer overflow

DMR – discharge monitoring report

D.O. – dissolved oxygen

*E. coli* – *Escherichia coli*

EFO – environmental field office

LB(lb) - pound

IC<sub>25</sub> – inhibition concentration causing 25% reduction in survival, reproduction and growth of the test organisms

IU – industrial user

IWS – industrial waste survey

LC<sub>50</sub> – acute test causing 50% lethality

MDL – method detection level

MGD – million gallons per day

MG/L(mg/l) – milligrams per liter

ML – minimum level of quantification  
ml – milliliter  
MLSS – mixed liquor suspended solids  
MOR – monthly operating report  
NODI – no discharge  
NOEC – no observed effect concentration  
NPDES – national pollutant discharge elimination system  
PL – permit limit  
POTW – publicly owned treatment works  
RDL – required detection limit  
SAR – semi-annual [pretreatment program] report  
SIU – significant industrial user  
SSO – sanitary sewer overflow  
STP – sewage treatment plant  
TCA – Tennessee code annotated  
TDEC – Tennessee Department of Environment and Conservation  
TIE/TRE – toxicity identification evaluation/toxicity reduction evaluation  
TMDL – total maximum daily load  
TRC – total residual chlorine  
TSS – total suspended solids  
WQBEL – water quality based effluent limit

**ADDENDUM TO RATIONALE**  
**Murfreesboro-Sinking Creek STP**  
**PERMIT NO. TN0022586**

June 15, 2017

Addendum prepared by: Miss Julie Harse

The division's water quality criteria for cyanide are listed as free cyanide for domestic water supply and fish & aquatic life. Free cyanide includes CN<sup>-</sup> and HCN. The toxicity to aquatic life at a normal pH is from the HCN which is created from the disassociation of complex cyanides.<sup>1</sup> The criterion for the recreational designated use is listed for total cyanide. The cyanide data submitted in the January 2016 permit renewal application was 0.280 mg/L average and 1.080 mg/L which exceeded all applicable water quality criteria based on the reasonable potential calculations. Follow up sampling that was conducted in March and April 2016 revealed levels that were lower than the original data but still exceeded the fish and aquatic life criteria. The permit contained monthly average and daily maximum total cyanide limits based on the most restrictive fish and aquatic life reasonable potential calculations. Applying the results of a total cyanide sample to all water quality criteria is considered a conservative approach which reduces sampling costs. The monthly sampling conducted by the city revealed permit exceedances of the monthly permit limit of 0.0047 mg/L based on sampling for total cyanide. The city began to also sample for free cyanide utilizing Method 4500CN E-2011. The free cyanide results were below the permit limit.

The city requested in a letter dated April 10, 2017 to utilize free cyanide results in determining compliance with its permit limit. Since the original application data exceeded the recreational and fish & aquatic values, the modified permit will have a free cyanide limit for the fish & aquatic value and a total cyanide limit for the recreational value. These limits will be protective of human health and the aquatic life. The limits will be as follows:

Parameter	Monthly Average (mg/L)	Daily Maximum (mg/L)
Free Cyanide (F&A)	0.0047	0.020
Total Cyanide (Recreational)	0.130	0.260

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<sup>1</sup> 21<sup>st</sup> Edition of Standard Method for the Examination of Water and Wastewater, Page 4-35

2013 WQC

PASS-THROUGH LIMITATIONS FOR METALS AND OTHER TOXIC SUBSTANCES  
WATER QUALITY BASED EFFLUENT CALCULATIONS  
OUTFALL 001

FACILITY: Murfreesboro STP PERMIT #: TN0022586 DATE: 3/7/2016 CALC BY: JAH

non-regulated stream worksheet (7Q10)

Stream	Stream	Waste	Ttl. Susp.	Hardness	Margin of
(7Q10)	(30Q5)	Flow	Solids	(as CaCO3)	Safety
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
0.200	0.600	16.000	10	172	90

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	Stream	Fish/Aqua. Life (F & AL) WQC		Fraction Dissolved [Fraction]	F & AL- instream allowable ambient conditions (Tot)		Calc. Effluent Concentration based on F & AL		Human Health Water Quality Criteria *						effluent limited case ug/l	Application
PARAMETER	Bckgmd. Conc. [ug/l]	Chronic [ug/l]	Acute [ug/l]		Chronic [ug/l]	Acute [ug/l]	Chronic [ug/l]	Acute [ug/l]	In-Stream Criteria Organisms [ug/l]	Water/Organisms [ug/l]	DWS [ug/l]	Organisms [ug/l]	Water/Organisms [ug/l]	DWS [ug/l]		
Copper (a,b)	2.0	14.2	22.4	0.348	41.0	64.4	37.3	58.7	N/A			N/A			80.0	20.0 20.0
Chromium III	1.0	115.6	888.4	0.202	571.3	4392.1	520.6	4002.3	N/A			N/A				10.0 10.0
Chromium VI	1.0	11.0	16.0	1.000	11.0	16.0	10.0	14.6	N/A			N/A				10.0 10.0
Chromium, Total	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A			60.0	10.0 10.0
Nickel (a,b)	10.0	82.3	740.8	0.432	190.3	1713.6	173.3	1561.4	4600.0			4294.91			180.0	20.0 20.0
Cadmium (a,b)	1.0	0.4	3.4	0.252	1.4	13.5	1.3	12.3	N/A			N/A			5.0	5.0 5.0
Lead (a,b)	1.0	4.5	115.9	0.184	24.6	630.4	22.4	574.5	N/A			N/A			45.0	5.0 5.0
Mercury (T) (c,e)	0.006	0.8	1.4	1.000	0.8	1.4	0.7	1.3	0.051			0.05			0.4	0.2 0.2
Silver (a,b,f)	1.0	N/A	8.2	1.000	N/A	8.2	N/A	7.4	N/A			N/A			5.0	10.0 10.0
Zinc (a,b)	3.0	187.0	185.5	0.288	649.5	644.2	591.8	587.0	26000.0			24277.40			200.0	15.0 61.0
Cyanide (d)	2.6	5.2	22.0	1.000	5.2	22.0	4.7	20.0	140.0	140.0	200.0	130.64	130.64	186.66	230.0	280.0 1080.0
Toluene	0.0								15000.0			14006.25			15.0	5.0 5.0
Benzene	0.0								510.0			476.21			3.0	1.0 1.0
1,1,1 Trichloroethane	0.0								N/A			N/A			30.0	1.0 1.0
Ethylbenzene	0.0								2100.0			1960.88			4.0	1.0 1.2
Carbon Tetrachloride	0.0								16.0			14.94			15.0	1.0 1.0
Chloroform	0.0								4700.0			4388.63			85.0	5.0 5.0
Tetrachloroethylene	0.0								33.0			30.81			25.0	1.0 1.0
Trichloroethylene	0.0								300.0			280.13			10.0	1.0 1.0
1,2 trans Dichloroethylene	0.0								10000.0			N/A			1.5	1.0 1.0
Methylene Chloride	0.0								5900.0			5509.13			50.0	5.0 5.0
Total Phenols	0.0								860000.0			803025.00			50.0	40.0 40.0
Naphthalene	0.0								N/A			N/A			1.0	1.0 1.0
Total Phthalates	0.0								N/A			N/A			64.5	NA NA

- a Denotes metals for which Fish & Aquatic Life Criteria are expressed as a function of total hardness.  
b The criteria for this metal is in the dissolved form at lab conditions. The calculated effluent concentration is in the total recoverable form.  
c The chronic criteria for mercury is not converted to dissolved, since it is based on fish tissue data rather than toxicity.  
d The criteria for this parameter is in the total form.  
e Previously, the Division established that 0.006 ug/L would be maximum background default if no sample data available or if all samples were <RDL (<0.2 ug/L), based on reference stream monitoring by DOE.  
f Silver limit is daily max if column 8 is most stringent.  
g When columns 7 or 8 result in a negative number, use results from columns 5 or 6, respectively.  
h When columns 12, 13 or 14 result in a negative number, use results from columns 9, 10 or 11, respectively, as applicable.

\* Domestic supply included in river use so pick from columns 7,8,12,13,14,15 or Domestic supply not included in river use so pick from columns 7, 8, 12 or 15.  
\*\* Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 30Q5 flow.

**ADDENDUM TO RATIONALE**  
**Murfreesboro-Sinking Creek STP**  
**PERMIT NO. TN0022586**

August 25, 2016

Addendum prepared by: Miss Julie Harse

Tennessee Clean Water Network submitted on June 22, 2016 comments on the draft permit. The division's response are provided in the below paragraphs.

Comment 1 – The facility did a study in July 2015 that included biological sampling along the West Fork Stones River. The study is uploaded to the public data viewer.

Comment 2 – It is not clear at this time what technology will be required in the nutrient reduction strategy. Based on the site visits by the permit writer, the facility has made operational changes to reduce the amount of nutrients being discharged to the stream.

Comment 3 – See response to Comment 1.

Comment 4 – Changes to the stream's buffer are covered under the division's general construction permit and aquatic resource alteration permits.

Comment 5 – The footnotes for the permit limit tables describe how the limits are to be calculated.

Comment 6 – The data viewer indicated the permit will not be issued until July 1, 2016. Prior to receiving the TCWN comments, the division had not received any comments or requests for public hearing regarding the permit. It is common practice to prepare the permits for issuance in the last week of the month.

The facility submitted on June 27, 2016 comments on the draft permit. The division's response are provided in the below paragraphs.

Comment 1 – The modified permit that was issued in December 2014 addressed the technical basis for maintaining the CBOD<sub>5</sub> limits. The explanation is provided again for reference.

The division rules state the following for municipal plants.

*"In the case of POTWs or domestic wastewater treatment plants, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow."  
(TN Rule 0400-40-05-.08(l))*

The combination of concentration and mass limits insures that the treatment levels are maintained even during a period of reduced wastewater flow. Additionally, the combination of reduced effluent flows with elevated concentrations will reduce the instream dissolved oxygen while still meeting the permit poundage limits. The concentration limits will be retained based on the 20.0 MGD design flow.

Comment 2 – The methodology for calculating the annual nutrient loading in Murfreesboro and Tullahoma results in the same level of compliance for each facility. The limits will remain the same.

Comment 3 – The flow for the reuse system will remain daily maximum. It is intended to represent the peak flow of the month.

Comment 4 – The note on page eight for application of chlorine is a general note that covers all outfalls should the primary disinfection system fail and emergency chlorination be required to disinfect the wastewater.

Comment 5 – The statement is standard language in all permits to address the situation of a facility needing to remove water from a stream to meet requirements for cooling, process, or reuse water. The division recognizes that the probability of the city needing to remove water from the stream to meet their reuse flow rate commitments is very low. The statement is the division's position should a set of circumstances arise that any facility needs to withdraw water from the stream.

Comment 6 – Comment noted for the record.

Comment 7 and 8 – The draft permit rationale presented the latest bioassessment data that had been submitted to the division's biologists. The division's biologists are in the process of reviewing additional data that has been submitted by the facility. If the biologists believe that the submitted data indicates that the stream is fully supporting of its designated uses, the division will conduct its own sampling to verify the results. It should be noted that the delisting of a stream through reduction in pollutants does not imply that the delisted stream has the ability to immediately accept additional pollutant loading.

## RATIONALE

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**Murfreesboro-Sinking Creek STP**  
**NPDES Permit No. TN0022586**  
**Date: July 11, 2017**  
**Permit Writer: Julie Harse**

### 1. FACILITY INFORMATION

<p><b>Murfreesboro-Sinking Creek STP</b> <b>Mr. Darren Gore P.E.- Director of Water and Sewer Department</b> <b>Murfreesboro, Rutherford County, Tennessee</b> <b>(615) 848-3209</b> <b>Treatment Plant Average Design Flow: 20 MGD</b> <b>Percentage Industrial Flow: 6.4%</b> <b>Treatment Description:</b> <b>Oxidation ditch [process] with nitrification and denitrification preceeded</b> <b>by screening and grit removal and followed by tertiary filtration, ultraviolet</b> <b>disinfection and post aeration. STP is designed to provide effluent suitable</b> <b>for irrigation and other non-potable uses as an alternative to stream</b> <b>discharge. The non-potable reuse water distribution system will utilize</b> <b>chlorine disinfection. Sludge is dewatered by rotary sludge presses for</b> <b>final disposal at municipal landfill in Rutherford County.</b> <b>Certified Operator Grades: STP: 4; CS: 2</b></p>
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### 2. RECEIVING STREAM INFORMATION

<p><b>West Fork of the Stones River at mile 10.5</b> <b>Watershed Group: Stones</b> <b>Hydrocode: 5130203</b> <b>Low Flow: 7Q10 = 0.2 MGD (0.3 CFS) Summer</b> <b>Low Flow: 7Q10 = 5.7 MGD (8.9 CFS) Winter</b> <b>Low Flow Reference:</b> <b>Regression equations; USGS Water-Resources Investigation Reports 86-</b> <b>4007 (winter) and 85-4191 (summer). USGS Water-Resources Investigation</b> <b>Report 95-4293 Station #03428200 data affected by WWTP effluent so not</b> <b>used.</b> <b>Water Quality Designation: Available/Unavailable Conditions Waters.</b> <b>TMDL: Permit will reflect requirements of TMDL for E.coli approved by EPA,</b> <b>June 17, 2006.</b> <b>Stream Classification Categories:</b></p>																
<table border="1"><tr><th><b>Domestic Wtr Supply</b></th><th><b>Industrial</b></th><th><b>Fish &amp; Aquatic</b></th><th><b>Recreation</b></th></tr><tr><td></td><td></td><td><b>X</b></td><td><b>X</b></td></tr><tr><th><b>Livestock Wtr &amp; Wlife</b></th><th><b>Irrigation</b></th><th><b>Navigation</b></th><td></td></tr><tr><td><b>X</b></td><td><b>X</b></td><td></td><td></td></tr></table>	<b>Domestic Wtr Supply</b>	<b>Industrial</b>	<b>Fish &amp; Aquatic</b>	<b>Recreation</b>			<b>X</b>	<b>X</b>	<b>Livestock Wtr &amp; Wlife</b>	<b>Irrigation</b>	<b>Navigation</b>		<b>X</b>	<b>X</b>		
<b>Domestic Wtr Supply</b>	<b>Industrial</b>	<b>Fish &amp; Aquatic</b>	<b>Recreation</b>													
		<b>X</b>	<b>X</b>													
<b>Livestock Wtr &amp; Wlife</b>	<b>Irrigation</b>	<b>Navigation</b>														
<b>X</b>	<b>X</b>															
<b>Water Quality Assessment: Not supporting due to sediment and nutrients</b>																

**3. CURRENT PERMIT STATUS**

<b>Permit Type:</b>	<b>Municipal</b>
<b>Classification:</b>	<b>Major</b>
<b>Issuance Date:</b>	<b>01-DEC-14</b>
<b>Expiration Date:</b>	<b>31-MAY-16</b>
<b>Effective Date:</b>	<b>01-JAN-15</b>

**4. NEW PERMIT LIMITATIONS AND COMPLIANCE SCHEDULE SUMMARY**

a. The draft permit proposes to add a limit for cyanide based on application and follow up sampling data.

b. Compliance Schedule Summary

Description of Report to be Submitted	Reference Section in Permit
Monthly Discharge Monitoring Reports	1.4.1
Monthly Operational Reports	1.4.4
Monthly Bypass and Overflow Summary Report	1.3.5.1
Industrial Waste Survey Report within 120 days of the effective permit date	3.2.a
Biomonitoring Report beginning within 90 days of the effective permit date	3.4

c. For comparison, this rationale contains a table depicting the previous permit limits and effluent monitoring requirements in Appendix 1.

**5. PREVIOUS PERMIT DISCHARGE MONITORING REPORT REVIEW**

A review of the DMR summary from did not indicate that the city had significant difficulty meeting its permit limits. A complete discharge monitoring report summary is located in Appendix 2. The last compliance inspection was conducted on August 20, 2015 by Ann Rochelle. The facility was determined to be out of compliance with the following notes in the database.

*“All treatment units are operational & the facility is producing a good quality effluent. DMR reporting is not complete: number of violations for overflows & toxicity test failures are not entered, toxicity failure results not entered, actual frequency of analysis & actual type of sample is not entered. Problems with procedures for e. coli calculations. Plant expansion underway, adding 2 oxidation ditches & 2 clarifiers, new headworks already completed.”*

The facility responded to the concerns in a letter dated October 14<sup>th</sup>, 2015. The inspectors concerns were resolved in the letter and the facility's status was returned to compliance. The letter can be viewed on the division's public data viewer at the following link:



[http://environment-online.tn.gov:8080/pls/enf\\_reports/f?p=9034:34051:12318341004489::NO:34051:P34051\\_PERMIT\\_NUMBER:TN0022586](http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34051:12318341004489::NO:34051:P34051_PERMIT_NUMBER:TN0022586)

## 6. PROPOSED EFFLUENT LIMITS AND RATIONALE

### 16 MGD Design Capacity Limits

PARAMETERS	MONTHLY AVERAGE CONCENTRATION (MG/L)	MONTHLY AVERAGE AMOUNT (LB/DAY)	WEEKLY AVERAGE CONCENTRATION (MG/L)	WEEKLY AVERAGE AMOUNT (LB/DAY)	DAILY MAXIMUM CONCENTRATION (MG/L)	DAILY MINIMUM PERCENT REMOVAL	MEASUREMENT FREQUENCY
CBOD <sub>5</sub> (May- Oct.)	5	667	7.5	1001	10	40	D.O. protection, Refer to 6.1 below
CBOD <sub>5</sub> (Nov.- April )	10	1334	15	2002	20	40	D.O. protection, Refer to 6.1
NH <sub>3</sub> -N (May - Oct.)	1	133	1.5	200	2	—	Ammonia Toxicity, Refer to 6.2 below
NH <sub>3</sub> -N (Nov.- April )	2.2	294	3.3	440	4.4	—	Ammonia Toxicity, Refer to 6.2 below
Total Suspended Solids	30	4003	40	5338	45	40	T.C.A. 0400-40-05-.09
Dissolved Oxygen (mg/l)	6.0 (daily minimum) instantaneous	—	—	—	—	—	D.O. protection, Refer to 6.1 below
Total Chlorine Residual (mg/l)	—	—	—	—	None (U.V.-disinfection used)	—	
Total Nitrogen	9.0*	1201	—	—	—	—	Refer to 6.5 below
Nitrite plus Nitrate	Report	Report			Report	Report (lb/d)	Refer to 6.5 below
Nitrite plus Nitrate	520 lb/day						Refer to 6.5 below
Total Phosphorous	Report	Report	—	—	Report	Report (lb/d)	Refer to 6.5 below
Total Phosphorus	307 lb/day						Refer to 6.5 below
Total Cyanide	0.0047				0.020		Refer to 6.8 below
<i>E. coli</i> (colonies/100ml)	126/100 ml	—	—	—	941/100 ml	—	T.C.A. 0400-40-03-.03, Refer to 6.6 below
Settleable Solids (ml/l)		—	—	—	1.0 (daily maximum)	—	T.C.A. 0400-40-05-.09
pH (standard units)	6.0-9.0	—	—	—	—	—	T.C.A. 0400-40-03-.03
Flow Influent (MGD)	Report	—	—	—	Report	—	Used to quantify pollutant load
Flow Effluent (MGD)	Report	—	—	—	Report	—	Used to quantify pollutant load
Flow Reuse system	Report				Report		Used to quantify pollutant load
IC <sub>25</sub> (May - Oct.)	Survival, reproduction and growth in 99% concentration						Refer to 6.7 below
IC <sub>25</sub> (Nov.- April)	Survival, reproduction and growth in 74% concentration						Refer to 6.7 below
Sanitary Sewer Overflows, Total Occurrences	Report						
Dry Weather Overflows, Total Occurrences	Report						
Bypass of Treatment, Total Occurrences	Report						

Note: Weekly limitations on CBOD<sub>5</sub> and TSS concentrations are given as required per 40 CFR 133.102(a)(2) or 133.102(a)(4)(2) & 133.102 (b)(2) respectively; daily CBOD<sub>5</sub> and TSS limitations are authorized by T.C.A. 0400-40-05-.09; monthly and weekly mass loads are limited per 40 CFR 122.45(f) and based on the design flow as per 40 CFR 122.45(b); monthly average percent removal rates for CBOD<sub>5</sub> and TSS are required per 40 CFR 133.102(a)(3) or 133.102(a)(4)(iii) and 133.102 (b)(3) respectively. A minimum 40% daily removal rate is required as equivalent to a daily mass load limitation.

## 20 MGD Design Capacity Limits

PARAMETERS	MONTHLY AVERAGE CONCENTRATION (MG/L)	MONTHLY AVERAGE AMOUNT (LB/DAY)	WEEKLY AVERAGE CONCENTRATION (MG/L)	WEEKLY AVERAGE AMOUNT (LB/DAY)	DAILY MAXIMUM CONCENTRATION (MG/L)	DAILY MINIMUM PERCENT REMOVAL	MEASUREMENT FREQUENCY
CBOD <sub>5</sub> (May- Oct. )	4	667	6	1001	8	40	D.O. protection, Refer to 6.1 below
CBOD <sub>5</sub> (Nov.- April )	8	1334	12	2002	16	40	D.O. protection, Refer to 6.1
NH <sub>3</sub> -N (May - Oct.)	0.8	133	1.2	200	1.6	—	Ammonia Toxicity, Refer to 6.2 below
NH <sub>3</sub> -N (Nov.- April )	1.8	294	2.6	440	3.5	—	Ammonia Toxicity, Refer to 6.2 below
Total Suspended Solids	24	4003	32	5338	36	40	T.C.A. 0400-40-05-.09
Dissolved Oxygen (mg/l)	6.0 (daily minimum) instantaneous	—	—	—	—	—	D.O. protection, Refer to 6.1 below
Total Chlorine Residual (mg/l)	—	—	—	—	None (U.V.-disinfection used)	—	
Total Nitrogen	Report	1201	—	—	—	—	Refer to 6.5 below
Nitrite plus Nitrate	Report	Report			Report	Report (lb/d)	Refer to 6.5 below
Nitrite plus Nitrate	520 lb/day						Refer to 6.5 below
Refer to 6.5 below	Report	Report	—	—	Report	Report (lb/d)	Refer to 6.5 below
Total Phosphorus	307 lb/day						Refer to 6.5 below
Total Cyanide	0.0047				0.020		Refer to 6.8 below
<i>E. coli</i> (colonies/100ml)	126/100 ml	—	—	—	941/100 ml	—	T.C.A. 0400-40-03-.03, Refer to 6.6 below
Settleable Solids (ml/l)		—	—	—	1.0 (daily maximum)	—	T.C.A. 0400-40-05-.09
pH (standard units)	6.0-9.0	—	—	—	—	—	T.C.A. 0400-40-03-.03
Flow Influent (MGD)	Report	—	—	—	Report	—	Used to quantify pollutant load
Flow Effluent (MGD)	Report	—	—	—	Report	—	Used to quantify pollutant load
Flow Reuse system	Report				Report		Used to quantify pollutant load
IC <sub>25</sub> (May - Oct.)	Survival, reproduction and growth in 99% concentration						Refer to 6.7 below
IC <sub>25</sub> (Nov.- April)	Survival, reproduction and growth in 78% concentration						Refer to 6.7 below
Sanitary Sewer Overflows, Total Occurrences	Report						
Dry Weather Overflows, Total Occurrences	Report						
Bypass of Treatment, Total Occurrences	Report						

Note: Weekly limitations on CBOD<sub>5</sub> and TSS concentrations are given as required per 40 CFR 133.102(a)(2) or 133.102(a)(4)(2) & 133.102 (b)(2) respectively; daily CBOD<sub>5</sub> and TSS limitations are authorized by T.C.A. 0400-40-05-.09; monthly and weekly mass loads are limited per 40 CFR 122.45(f) and based on the design flow as per 40 CFR 122.45(b); monthly average percent removal rates for CBOD<sub>5</sub> and TSS are required per 40 CFR 133.102(a)(3) or 133.102(a)(4)(iii) and 133.102 (b)(3) respectively. A minimum 40% daily removal rate is required as equivalent to a daily mass load limitation.

## **6.1. CBOD<sub>5</sub>, DISSOLVED OXYGEN, AND PERCENT REMOVALS REQUIREMENTS**

- a. Streeter-Phelps modeling was performed during a previous issuance of this permit at various conditions to determine allowable organic loadings. The monthly average limits for CBOD<sub>5</sub> (5 mg/l-summer, 10 mg/l-winter), NH<sub>3</sub>-N (1 mg/l-summer, 2.2 mg/l-winter), and D.O. (6.0 mg/l) still apply for the 16 MGD design flow rate permit limits and are considered sufficient to result in an instream dissolved oxygen concentration that remains above the required minimum of 5.0 mg/l. Modeling results are located in the permit file administrative record. Additionally, the allowable organic loadings will be maintained for anti-degradation purposes when this facility expands from 16.0 MGD to 20.0 MGD. The concentration limits have been adjusted to reflect the increased flow to 20 MGD.

In addition to CBOD<sub>5</sub>, NH<sub>3</sub>-N undergoes biological oxidation in a receiving stream thereby utilizing in stream oxygen and potentially reducing oxygen levels below water quality standards. Ammonia as N is also a pollutant that exhibits toxicity to fish and other aquatic life. The two affects are analyzed separately and the division imposes the most stringent limit in the permit.

- b. The treatment facility is required to remove 85% of the CBOD<sub>5</sub> and TSS that enter the facility on a monthly basis. This is part of the minimum requirement for all municipal treatment facilities contained in Code of Federal Regulations 40 Part 133.102. The reasons stated by the U.S.E.P.A. for these requirements are to achieve these two basic objectives:
  - (1) To encourage municipalities to correct excessive inflow and infiltration (I/I) problems in their sanitary sewer systems, and
  - (2) To help prevent intentional dilution of the influent wastewater as a means of meeting permit limits.

The treatment facility is required to remove 40% of the CBOD<sub>5</sub> and TSS that enter the facility on a daily basis. This percent removal will be calculated three times per week and recorded on the Monthly Operation Report. The number of excursions (days when CBOD<sub>5</sub> and/or TSS removal is less than 40%) will be reported on the Discharge Monitoring Report.

## **6.2. NH<sub>3</sub>-N TOXICITY**

To access toxicity impacts, the state utilizes the EPA document, 1999 Update to Ambient Water Quality Criteria for Ammonia, pursuant to 1200-4-3-.0-3(3)(j), and assumed stream temperatures of 27°C and 17°C and pH of 8.0 to derive an allowable instream protection value protective of chronic exposure to a continuous discharge. A mass balance equation with sewage treatment facility and stream flows and this allowable value determines the monthly average permit limit. The criteria document states that a 30Q5 flow value is protective in deriving allowable values. Where the division has 30Q5 flow values, the division may use them. Otherwise, the division utilizes the available 7Q10 or 1Q10 values that are generally more

conservative. The criteria continuous concentrations (CCC) derived from assumed temperature and pH values are as follows:

**CCC values based on temperature and pH, in mg/L:**

Temperature (°C)	7.5 pH	8.0 pH	Temperature (°C)	7.5 pH	8.0 pH
25	2.22	1.24	15	4.22	2.36
27	1.94	1.09	17	3.72	2.07
30	1.61	0.90	20	3.06	1.71

The mass balance equation is as follows:

$$CCC = \frac{Q_S C_S + Q_{STP} C_{STP}}{Q_S + Q_{STP}} \quad \text{or,} \quad C_{STP} = \frac{CCC(Q_S + Q_{STP}) - (Q_S C_S)}{Q_{STP}}$$

where:

CCC = Criteria continuous concentration (mg/l)  
 $Q_S$  = 7Q10 flow of receiving stream (MGD)  
 $Q_{STP}$  = Design flow of STP (MGD)  
 $C_S$  = Assumed/Measured instream  $\text{NH}_3$  (mg/l)  
 $C_{STP}$  = Allowable STP discharge of  $\text{NH}_3$  (mg/l)

**16 MGD Calculations**

$$C_{STP} = \frac{1.09 (0.2 \text{ MGD} + 16 \text{ MGD}) - (0.2 \text{ MGD} \times 0.1 \text{ mg/l})}{16 \text{ MGD}} = 1.1 \text{ mg/l (summer)}$$

$$C_{STP} = \frac{2.07 (5.7 \text{ MGD} + 16 \text{ MGD}) - (5.7 \text{ MGD} \times 0.1 \text{ mg/l})}{16 \text{ MGD}} = 3.6 \text{ mg/l (winter)}$$

**20 MGD Calculations**

$$C_{STP} = \frac{1.09 (0.2 \text{ MGD} + 20 \text{ MGD}) - (0.2 \text{ MGD} \times 0.1 \text{ mg/l})}{20 \text{ MGD}} = 1.1 \text{ mg/l (summer)}$$

$$C_{STP} = \frac{2.07 (5.7 \text{ MGD} + 20 \text{ MGD}) - (5.7 \text{ MGD} \times 0.1 \text{ mg/l})}{20 \text{ MGD}} = 2.7 \text{ mg/l (winter)}$$

The monthly average limits for  $\text{NH}_3\text{-N}$  that are applied to the permit are to protect dissolved oxygen. The limits are more restrictive than the toxicity limits calculated above. Additionally, the allowable ammonia loadings will be maintained for anti-

degradation purposes when this facility expands from 16.0 MGD to 20.0 MGD. The concentration limits have been adjusted to reflect the increased flow to 20 MGD.

### 6.3. CHLORINATION

This facility disinfects its discharge to the Stones River via ultraviolet radiation and chlorine is applied to the non-discharging reuse water. This permit will continue to require reporting that the disinfection unit is operating and will report when UV bulbs are replaced and quantity (how many bulbs replaced) at that time.”

### 6.4 SETTLEABLE SOLIDS LIMITATION

State Rule 1200-4-5-.03 requires that municipal wastewater treatment plants achieve a settleable solid limit of 1.0 mg/l, so the parameter must be monitored and reported.

### 6.5. TOTAL NITROGEN AND TOTAL PHOSPHOROUS LIMITATIONS

The receiving stream is partially supportive of its designated uses due to nitrate-nitrites and phosphorous from the municipal facility. The current limits for nutrients are a combination of technically based values and holding the facility to its existing loading. The total nitrogen limit (9.0 mg/L, 1201 lb/day) was based on textbook removal rates with the rationale in the 2005 permit as follows:

*“The previous fact sheet indicated that an effluent limitation of 5.0 mg/l would ensure a nutrient contribution toward organic enrichment which is less than or equal to the amount contributed from the 8.0 MGD treatment facility. The limit of 5.0 mg/l is considered a technology-based limit applicable to facilities employing the denitrification process. Reconsideration of the past STP performance allows for some relaxation of this limit.*

*According to Phosphorous and Nitrogen Removal from Municipal Wastewater Principles and Practice. Second Edition . Richard Sedlak . Editor. Lewis Publishers . 1991, conventional biological wastewater treatment removes only a small fraction of nitrogen due to its being a necessary ingredient in the biomass that is formed and subsequently settled out in the clarifiers. The reference states the theoretical maximum ratio of nitrogen removed to BOD removed is only 0.075. Influent nitrogen into the previous 8.0 MGD facility is not specifically known. However, numerous textbooks quote 25 and 30 mg/l as typical nitrogen concentrations in raw wastewater. The text referenced in the paragraph says that municipal sewage can contain nitrogen with concentrations between 85 and 20 mg/l depending on whether the sewage is "strong" or "weak".*

*In the worse case, this facility receives "weak" influent due to infiltration and inflow. Additionally, the previous facility should have*

*achieved an average monthly BOD reduction of 85%. Therefore, nitrogen removal could have expected to approximate 6% (0.075 X 85%). Assuming a 20 mg/l influent concentration is reduced by only 6%, the effluent concentration would have been 18 mg/l from the 8.0 MGD facility. This equates to an effluent limitation of 9.0 mg/l for a 16.0 MGD facility.”*

The hold the line limits were added to the 2012 data and based on the following data:

DMR DATA				DATA ANALYSIS			
Month	NO2_3	TP	MA Flow	NO2_3 Load	NO2_3 6 MO AVE	TP Load	TP 6 MO AVE
04/30/2007	4	1.75	12.055				
05/31/2007	3.25	2.7	11.059	299.8			
06/30/2007	2.8	3.45	8.805	205.6			
07/31/2007	3.1	NODI=9	9.622	248.8			
08/31/2007	3.15	NODI=9	9.600	252.2			
09/30/2007	2.85	NODI=9	10.769	256.0			
10/31/2007	3.5	NODI=8	11.178	326.3	264.8		
11/30/2007	2.45	NODI=9	13.676	279.4			
12/31/2007	2.2	NODI=8	14.688	269.5			
01/31/2008	3.4	3.3	13.375	379.3			
02/29/2008	2.6	NODI=9	17.343	376.1			
03/31/2008	3.85	1.95	16.215	520.6			
04/30/2008	3.2	0.4	17.253	460.5	380.9		
05/31/2008	3.5	3.8	13.174	384.6			
06/30/2008	2.85	NODI=9	11.595	275.6			
07/31/2008	2.15	2.9	9.008	161.5			
08/31/2008	2.5	2.5	11.000	229.4			
09/30/2008	2.9	2.6	8.200	198.3			
10/31/2008	2.9	3.1	7.000	169.3	236.4		
11/30/2008	4	3.9	7.500	250.2		243.9	
12/31/2008	3.3	1.9	15.400	423.8		244.0	
01/31/2009	2.9	0.6	15.200	367.6		76.1	
02/28/2009	2.7	1.1	13.800	310.7		126.6	
03/31/2009	2.1	0.9	19.200	336.3		144.1	
04/30/2009	2.8	0.4	18.000	420.3	351.5	60.0	149.1
05/31/2009	1.9	1.9	22.000	348.6		348.6	
06/30/2009	3.3	4.4	9.400	258.7		344.9	
07/31/2009	3.4	4.3	13.200	374.3		473.4	
08/31/2009	3.7	3	9.300	287.0		232.7	
09/30/2009	3.4	3.6	11.500	326.1		345.3	
10/31/2009	9	2.8	16.300	1223.5	469.7	380.6	354.3
11/30/2009	5.1	1.9	14.600	621.0		231.4	
12/31/2009	4.1	2	18.200	622.3		303.6	
01/31/2010	3.7	1.4	19.300	595.6		225.3	
02/28/2010	3.6	0.7	21.900	657.5		127.9	
03/31/2010	2.4	2.3	15.900	318.3		305.0	
04/30/2010	4.7	2.8	13.800	540.9	559.3	322.3	252.6
05/31/2010	3.7	0.6	21.900	675.8		109.6	
06/30/2010	3.9	2	15.100	491.1		251.9	
07/31/2010	4.4	3.5	13.900	510.1		405.7	
08/31/2010	5.8	2.6	15.800	764.3		342.6	
09/30/2010	5	3.3	11.900	496.2		327.5	
10/31/2010	9.2	4.6	11.000	844.0	630.3	422.0	309.9
11/30/2010	6.3	3.3	13.300	698.8		366.0	
12/31/2010	5	1.1	13.100	546.3		120.2	
01/31/2011	7.5	1.7	13.300	831.9		188.6	
02/28/2011	6.5	2	14.000	758.9		233.5	
03/31/2011	5.4	0.7	16.400	738.6		95.7	
04/30/2011	4.3	1.4	18.200	652.7	704.5	212.5	202.8
05/31/2011	2.6	0.7	14.100				
06/30/2011	3.6	2.4	8.500				
95th percentile	7	4.26					
AVE	3.9	2.3					
STD DEV	1.59	1.17					
Nitrite plus Nitrate and TP load limits are calculated below on average effluent values and 16.0 MGD.							
The 16.0 MGD is the design flow for this facility.							
Actual loads will be calculated on daily flows rather than monthly average flows as shown here.							
Only seasons with 6 datapoints were analyzed. Calculated values exceeding the proposed limits are shaded.							
Proposed Effluent Limits:							
NO2_3 lb/d =	3.9 mg/l x 16.0 MGD x 8.34	= 520					
TP lb/d =	2.3 mg/L x 16.0 MGD x 8.34	= 307					



The goal of the division's nutrient strategy is to address impairments for nitrogen and phosphorous with a combination of technology based limits and instream bioassessments. The bioassessments document the improvement in the overall quality of the stream. The discharge from the City of Murfreesboro is located in bioregion 71i with a drainage area of greater than two square miles therefore the Tennessee Macroinvertebrate Index (TMI) target score is 32. The recent TMI scores for the West Fork Stones River are the following:

River Mile	TMI Score	Date	Data Source
13.6	32	7/11/2015	AQUA1507006 (TDEC adjusted score)
11.4	38	7/11/2015	AQUA1507006 (TDEC adjusted score)
10.8	22	4/28/2009	PAI
9.7	28	3/4/2013	TDEC
7.7	38	7/11/2015	AQUA1507006 (TDEC adjusted score)
6.2	40	7/11/2015	AQUA1507006 (TDEC adjusted score)

In the new permit, the previous permit limits for nitrogen and phosphorous will be retained. The permit limits for the expanded 20 MGD plant will only have poundage limits since the USGS SPARROW modeling works with annual poundage. The USGS SPARROW modeling for this watershed has not been calibrated at the time of this permit issuance. Should the division's nutrient reduction strategy require more restrictive permit limits, the division may need to reopen the permit for modification.

#### 6.6. **E. COLI/ REQUIREMENTS**

Disinfection of wastewater is required to protect the receiving stream from pathogenic microorganisms. *E. coli* are indicator organisms used as a measure of bacteriological health of a receiving stream and the effectiveness of disinfection. The *E. coli* daily maximum limit of 487 colonies per 100 ml applies to lakes and exceptional Tennessee waters. A maximum daily limit of 941 colonies per 100 ml applies to all other recreational waters.

#### 6.7. **BIOMONITORING**

The division evaluates all dischargers for reasonable potential to exceed the narrative water quality criterion, "no toxics in toxic amounts". The division has determined that for municipal facilities with stream dilutions of less than 500 to 1, any of the following conditions may demonstrate reasonable potential to exceed this criterion.

- Toxicity is suspected or demonstrated.
- A pretreatment program is required.
- The design capacity of the facility is greater than 1.0 MGD.

The following calculation is the required dilution at which chronic toxicity testing must meet permit requirements.

## 16 MGD Design Flow Rate

### Summer

$$IC_{25} \% = \frac{\text{Design Flow}}{\text{Low Flow} + \text{Design Flow}} * 100 \geq \frac{16}{0.2 + 16} * 100 > 99\%$$

### Winter

$$IC_{25} \% = \frac{\text{Design Flow}}{\text{Low Flow} + \text{Design Flow}} * 100 \geq \frac{16}{5.7 + 16} * 100 > 74\%$$

## 20 MGD Design Flow Rate

### Summer

$$IC_{25} \% = \frac{\text{Design Flow}}{\text{Low Flow} + \text{Design Flow}} * 100 \geq \frac{20}{0.2 + 20} * 100 > 99\%$$

### Winter

$$IC_{25} \% = \frac{\text{Design Flow}}{\text{Low Flow} + \text{Design Flow}} * 100 \geq \frac{20}{5.7 + 20} * 100 > 78\%$$

## 6.8. METALS AND TOXICS

Pass-through limitations for heavy metals and other toxic substances have been recalculated as part of the permit issuance process and/or due to changes in industrial waste contribution to the POTW. This POTW is required to implement/maintain a pretreatment program. More frequent monitoring will be required **in the permit** if (a) the reported concentrations approach or exceed calculated allowable values, (b) significant amounts of particular pollutants are present which may impact the treatment process sludge character or the receiving stream, or (c) minimum information is lacking to accurately calculate water quality protection values, in which case additional stream monitoring may also be required. Appendix 3 lists the metal and toxic parameters calculations and the procedure used to derive the results.

Although the semi-annual pretreatment data does not indicate that the potential exists for the water quality criteria for any parameter to be exceeded, the application data did provide cyanide data that required additional review. The reasonable potential calculations in Appendix 3 have the following acceptable effluent concentrations.

	Concentration (mg/L)
Fish & Aquatic Life – Chronic	0.0047

Fish & Aquatic Life – Acute	0.020
Recreational	0.130
Recreational & Domestic Water Supply	0.130
Domestic Water Supply	0.185

The sample that was collected on 11/31/2015 was five times the domestic water supply allowable effluent concentration (1.08 mg/L). Discussions between the permit writer and the facility resulted in the initiation of sampling for cyanide at a frequency of three times a week (See below table).

Date	CN mg/L	
	Influent	Effluent
NPDES Permit Application		
10/26/2015	NA	0.0234
11/31/2015	NA	1.08
11/25/2015	NA	0.005
12/9/2015	NA	0.005
Supplemental Data		
3/21/2016	0.005	0.005
3/23/2016	0.005	0.005
3/25/2016	0.005	0.005
3/28/2016	0.005	0.005
3/30/2016	0.005	0.005
4/1/2016	0.005	0.0140
4/4/2016	0.0080	0.0050
4/6/2016	0.0110	0.005
4/8/2016	0.0130	0.005
4/11/2016	0.0130	0.005
Non-detect Shaded Blue		
Allowable Concentration		
Chronic	0.0047	
Acute	0.0200	

The follow up sampling did not provide additional data that exceeded the domestic water supply allowable concentration of 0.185 mg/L. However the facility did have four samples that exceeded the chronic concentration and two samples that exceeded the acute concentration. The new permit will have a monthly average limit of 0.0047 mg/L and a daily maximum limit of 0.020 mg/L.

The previous permit required the monthly sampling for selenium. The data did not indicate the reasonable potential to violate water quality so the new permit will remove the selenium limit.

## 6.9. VOLATILE ORGANIC, ACID-EXTRACTABLE, AND BASE-NEUTRAL COMPOUNDS

The division evaluated effluent concentrations of volatile organic, acid-extractable, and base-neutral compounds and antimony, arsenic, beryllium, selenium and

thallium for potential to violate water quality criteria using the following mass balance equation:

$$C_m = \frac{Q_s C_s + Q_w C_w}{Q_s + Q_w}$$

where:

$C_m$  = resulting in-stream concentration after mixing  
 $C_w$  = concentration of pollutant in wastewater  
 $C_s$  = stream background concentration  
 $Q_w$  = wastewater flow, (STP design flow)  
 $Q_s$  = stream low flow

**to protect water quality:**

$$C_w \leq C_a$$

where:

$C_a$  = STP effluent concentration allowable  
 $= \frac{(S_A) [C_m (Q_s + Q_w) - Q_s C_s]}{Q_w}$

and  $(S_A)$  = the percent “Stream Allocation”.

The reasonable potential evaluation uses the following assumptions and procedures:

- a. Stream background concentrations,  $C_s$ , for all volatile organic, acid-extractable, and base-neutral compounds equal zero unless actual stream data exists to show otherwise. Use of the effluent concentrations of such pollutants contributed by upstream dischargers as background is not justifiable due to the volatility and reactivity of these pollutants.
- b. The stream allocation,  $S_A$ , is 90% and is used as a factor of safety.
- c. A mass balance uses the STP design flow, the receiving stream critical low flow (7Q10 or 1Q10), the state water quality numeric criteria, and the stream allocation safety factor to derive the allowable effluent concentrations.
- d. When pollutants have potential to violate standards because the concentrations are below the scan detection levels but could be above the allowable water quality based effluent concentrations, the pollutants are handled one of three (3) ways:
  - i. Additional testing of detected and non-detected pollutants is required if contributing industrial processes are likely to contain them and the effluent scans have not met the minimum required detection levels (RDL) in the state water quality standards or approximated the method detection limits (MDL) of the approved test methods for the pollutants in 40 CFR Part 136.

- ii. If the required RDL has been used and resulted in non-detection, or if an MDL has been used with non-detection and the contributing industrial processes do not reasonably contain that pollutant, the division drops the pollutant from further consideration.
- iii. Pollutants detected at levels high enough to violate standards are limited in the permit to the allowable concentration, Cw, based on STP design flow.

Calculations for this permit have been done using a standardized spreadsheet, titled "WQ Based Effluent Calculations- Other Compounds", and are located in Appendix 4. All metals other than antimony, arsenic, beryllium, selenium, and thallium have been evaluated using procedures described in the rationale, or fact sheet, section headed, "METALS & TOXICS".

The evaluation indicates that volatile organic, acid extractable, and base neutral compounds and antimony, arsenic, beryllium, selenium, and thallium do not exhibit the potential to violate water quality criteria and thus will not be given effluent limitations and monitoring requirements in the permit.

#### **6.10. OVERFLOW AND BYPASS REPORTING**

For the purposes of demonstrating proper operation of the collection, transmission, and treatment system, the permit defines overflow as any release of sewage other than through permitted outfalls. This definition includes, but is not necessarily limited to, sanitary sewer overflows and dry weather overflows as defined. For example, a collection system blockage or hydraulic overload that causes backup and release of sewage into a building during a wet weather event may not clearly fit either the definition of a sanitary sewer overflow or a dry weather overflow. Still, any unpermitted release potentially warrants permittee mitigation of human health and/or water quality impacts via direct or indirect contact and demonstrates a hydraulic problem in the system that warrants permittee consideration as part of proper operation and maintenance of the system.

However, for the more typical, unpermitted, releases into the environment, this permit intends interchangeable use of the terms, "overflow" and "sanitary sewer overflow" for compliance reporting purposes.

## **7. OTHER PERMIT REQUIREMENTS AND CONDITIONS**

### **7.1. CERTIFIED WASTEWATER TREATMENT OPERATOR**

The waste treatment facilities shall be operated under the supervision of a Grade 4 certified wastewater treatment operator in accordance with the Water Environmental Health Act of 1984. Operator grades are under jurisdiction of the Water and Wastewater Operators Certification Board. This NPDES permit is under jurisdiction of the Tennessee Board of Water Quality, Oil and Gas. Operator grades are rated and recommended by the Division of Water Resources pursuant to Rule 0400-49-01 (formerly 1200-05-03) and are included in this fact sheet for reference. The grades are intentionally not specified in the permit so that the operation certification board can authorize changes in grade without conflicting with this permit.

### **7.2. COLLECTION SYSTEM CERTIFIED OPERATOR**

The collection system shall be operated under the supervision of a Grade 2 certified collection system operator in accordance with the Water Environmental Health Act of 1984.

### **7.3. PRETREATMENT PROGRAM**

The Murfreesboro-Sinking Creek STP has an approved pretreatment program. An updated Industrial Waste Survey must be completed within 120 days of the effective date of the permit, unless such a survey has been submitted within 3 years of the effective date.

At least once each reporting period, all permittees with approved pretreatment programs are required to analyze the STP influent and effluent for the following pollutant parameters: chromium (trivalent and hexavalent and total if drinking water use applies), copper, lead, nickel, zinc, silver, cadmium, mercury, total phenols, and cyanide. These pollutants were selected because, historically, they are the ones that tend to be predominant in industrial wastewaters. Other pollutants may be added to the list, as required.

During preparation of this permit, data from previous semiannual reports were analyzed. Based on our review of the semiannual reports and other documents, sampling for additional pollutants is not required at this time.

### **7.4. BIOSOLIDS/SLUDGE MANAGEMENT**

The Clean Water Act (CWA) requires that any NPDES permit issued to a publicly owned treatment works or any other treatment works treating domestic sewage shall comply with 40 CFR Part 503, the federal regulation governing the use and disposal of sewage sludge. It is important to note that “biosolids” are sewage sludge that has been treated to a level so that they can be land applied.

The language in subpart 3.3 of the permit, relative to biosolids management, a CWA requirement, allows the “permitting authority” under 40 CFR Part 503.9(p) to be able

to enforce the provisions of Part 503. The “permitting authority” relative to Part 503 is either a state that has been delegated biosolids management authority or the applicable EPA Region; in the case of Tennessee it is EPA-Region 4.

Tennessee regulates the land application of biosolids under state rules, Chapter 0400-40-15. The state rules became effective on June 30, 2013. Under these state rules, all facilities that land apply biosolids must obtain a biosolids permit from the division. The land application of biosolids under state rules will be regulated through either a general permit or by an individual permit. It is anticipated that the permitting of biosolids land application will begin near the beginning of calendar year 2014. Questions about the division’s biosolids regulations and permitting program should be directed to the division’s Biosolids Coordinator at:

State of Tennessee  
Department of Environment and Conservation  
Division of Water Resources  
William R. Snodgrass - Tennessee Tower  
312 Rosa L. Parks Avenue, 11th Floor  
Nashville, Tennessee 37243-1102  
(615) 532-0625

#### **7.5. PERMIT TERM**

This permit is being reissued for 5 years in order to coordinate its reissuance with other permits located within the Stones Watershed.

#### **8. ANTIDEGRADATION STATEMENT/WATER QUALITY STATUS**

Tennessee’s Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06. It is the purpose of Tennessee’s standards to fully protect existing uses of all surface waters as established under the Act. Stream determinations for this permit action are associated with the waterbody segment identified by the division as segment ID# TN05130203018\_2000. The division has made a water quality assessment of this water and has found the receiving stream to be neither an exceptional nor outstanding national resource water. Additionally, this water is assessed as not having or maintaining the quality to maintain the fish and aquatic life designated use due to sedimentation/siltation, phosphorus and nitrite plus nitrate from land development/redevelopment and municipal point sources. There is no proposed increase in loads for any of the above parameters and the permit will continue to contain nutrient limits.

## APPENDIX 1 PREVIOUS PERMIT LIMITS

### 16 MGD Design Flow

PARAMETERS	MONTHLY AVERAGE CONCENTRATION (MG/L)	MONTHLY AVERAGE AMOUNT (LB/DAY)	WEEKLY AVERAGE CONCENTRATION (MG/L)	WEEKLY AVERAGE AMOUNT (LB/DAY)	DAILY MAXIMUM CONCENTRATION (MG/L)	DAILY MINIMUM PERCENT REMOVAL	MEASUREMENT FREQUENCY
CBOD <sub>5</sub> (May 1- Oct. 31)	5	667	7.5	1001	10	40	1/day
CBOD <sub>5</sub> (Nov. 1- April 30)	10	1334	15	2002	20	40	1/day
NH <sub>3</sub> -N (May 1- Oct. 31)	1	133	1.5	200	2	—	1/day
NH <sub>3</sub> -N (Nov. 1- April 30)	2.2	294	3.3	440	4.4	—	1/day
Total Suspended Solids	30	4003	40	5338	45	40	1/day
Dissolved Oxygen (mg/l)	6.0 (daily minimum) instantaneous	—	—	—	—	—	1/day
Total Chlorine Residual (mg/l)	—	—	—	—	None (U.V.)	—	N/A
Total Nitrogen	9.0	1201	—	—	—	—	2/month
Nitrite plus Nitrate	Report						2/month
Nitrite plus Nitrate	520 lb/day*, average daily load (ADL), May 1 – October 31; November 1 – April 30						Semi-annually
Kjeldahl Nitrogen, total	Report						2/month
Total Phosphorous	Report	—	—	—	—	—	2/month
Total Phosphorous	307 lb/day*, average daily load (ADL), May 1 – October 31; November 1 – April 30						Semi-annually
Total Selenium	0.0046				0.0182		bi-monthly
<i>E. coli</i> (colonies/100ml)	126/100 ml	—	—	—	941/100 ml	—	1/day
Settleable Solids (ml/l)		—	—	—	1.0 (daily maximum)	—	1/week
pH (standard units)	6.0-9.0	—	—	—	—	—	1/day
Flow Influent (MGD)	Report	—	—	—	Report	—	1/day
Flow Effluent (MGD)	Report	—	—	—	Report	—	1/day
Flow Reuse system	Report				Report		1/day
IC <sub>25</sub> (May 1- Oct. 31)	Survival, reproduction and growth in 99% concentration						Semi-annually
IC <sub>25</sub> (Nov. 1- April 30)	Survival, reproduction and growth in 74% concentration						Semi-annually
Sanitary Sewer Overflows, Total Occurrences			Report				continuous



Dry Weather Overflows, Total Occurrences	Report	continuous
Bypass of Treatment, Total Occurrences	Report	continuous
<b>Appendix 1</b> <b>PREVIOUS PERMIT LIMITS (Continued)</b>		
ReUse System: E.coli	14 colonies/100ml Daily Maximum (plus notes shown below)	7/week
ReUse System: residual Chlorine	1 mg/L (after 30 min.)	7/week or continuous
<p>(1) Daily fecal coliform and residual chlorine samples should be collected at the point of release from the treatment system. Quarterly fecal coliform and residual chlorine samples should be collected for analysis at two points within the distribution system: one that is representative of the system's average residence time and one that is representative of the system's maximum residence time.</p> <p>This permit allows the operation of a spray and/or drip irrigation system. The operation should be such that there is no contamination of and no wastewater discharge to any surface or subsurface stream because of collected pools of water called "ponding" or because of improper irrigation. Any runoff due to improper operation must be reported in writing to the Division of Water Resources, Environmental Field Office - Nashville within 5 days of the incident. In addition, the reuse irrigation system must be operated in a manner preventing the creation of a public health hazard or a public/private nuisance.</p>		

**20 MGD Design Flow**

PARAMETERS	MONTHLY AVERAGE CONCENTRATION (MG/L)	MONTHLY AVERAGE AMOUNT (LB/DAY)	WEEKLY AVERAGE CONCENTRATION (MG/L)	WEEKLY AVERAGE AMOUNT (LB/DAY)	DAILY MAXIMUM CONCENTRATION (MG/L)	DAILY MINIMUM PERCENT REMOVAL	MEASUREMENT FREQUENCY
CBOD <sub>5</sub> (May 1- Oct. 31)	4	667	6	1001	8	40	1/day
CBOD <sub>5</sub> (Nov. 1- April 30)	8	1334	12	2002	16	40	1/day
NH <sub>3</sub> -N (May 1- Oct. 31)	0.8	133	1.2	200	1.6	—	1/day
NH <sub>3</sub> -N (Nov. 1- April 30)	1.8	294	2.6	440	3.5	—	1/day
Total Suspended Solids	24	4003	32	5338	36	40	1/day
Dissolved Oxygen (mg/l)	6.0 (daily minimum) instantaneous	—	—	—	—	—	1/day
Total Chlorine Residual (mg/l)	—	—	—	—	None (U.V.)	—	N/A
Total Nitrogen	9.0	1201	—	—	—	—	2/month
Nitrite plus Nitrate	Report						2/month
Nitrite plus Nitrate	520 lb/day*, average daily load (ADL), May 1 – October 31; November 1 – April 30						Semi-annually
Kjeldahl Nitrogen, total	Report						2/month
Total Phosphorous	Report	—	—	—	—	—	2/month
Total Phosphorous	307 lb/day*, average daily load (ADL), May 1 – October 31; November 1 – April 30						Semi-annually
Total Selenium	0.0045				0.0182		bi-monthly
<i>E. coli</i> (colonies/100ml)	126/100 ml	—	—	—	941/100 ml	—	1/day
Settleable Solids (ml/l)		—	—	—	1.0 (daily maximum)	—	1/week
pH (standard units)	6.0-9.0	—	—	—	—	—	1/day
Flow Influent (MGD)	Report	—	—	—	Report	—	1/day
Flow Effluent (MGD)	Report	—	—	—	Report	—	1/day
Flow Reuse system	Report				Report		1/day
IC <sub>25</sub> (May 1- Oct. 31)	Survival, reproduction and growth in 99% concentration						Semi-annually
IC <sub>25</sub> (Nov. 1- April 30)	Survival, reproduction and growth in 78% concentration						Semi-annually
Sanitary Sewer Overflows, Total Occurrences			Report				continuous
Dry Weather Overflows, Total Occurrences			Report				continuous
Bypass of Treatment, Total Occurrences			Report				continuous

Appendix 1 PREVIOUS PERMIT LIMITS (Continued)		
ReUse System: E.coli	14 colonies/100ml Daily Maximum (plus notes shown below)	7/week
ReUse System: residual Chlorine	1 mg/L (after 30 min.)	7/week or continuous
<p>(1) Daily fecal coliform and residual chlorine samples should be collected at the point of release from the treatment system. Quarterly fecal coliform and residual chlorine samples should be collected for analysis at two points within the distribution system: one that is representative of the system's average residence time and one that is representative of the system's maximum residence time.</p> <p>This permit allows the operation of a spray and/or drip irrigation system. The operation should be such that there is no contamination of and no wastewater discharge to any surface or subsurface stream because of collected pools of water called "ponding" or because of improper irrigation. Any runoff due to improper operation must be reported in writing to the Division of Water Resources, Environmental Field Office - Nashville within 5 days of the incident. In addition, the reuse irrigation system must be operated in a manner preventing the creation of a public health hazard or a public/private nuisance.</p>		

## APPENDIX 2

### Discharge Monitoring Report Summary

Date	Overflow		Bypass	Flow				CBOD								Total Suspended Solids					
				Influent		Effluent		Monthly				Daily		Monthly						Daily	
	# (Wet)	# (Dry)	# of Bypass	Monthly Average	Daily Max.	Monthly Average	Daily Max.	Influent Conc.	Effluent Conc.	Percent Removal	Average Amount	Influent Conc.	Effluent Conc.	Influent Conc.	Effluent Conc.	Percent Removal	Average Amount	Influent Conc.	Effluent Conc.	Influent Conc.	Effluent Conc.
				MGD	MGD	MGD	MGD	mg/L	mg/L	%	lb/day	mg/L	mg/L	mg/L	mg/L	%	lb/day	mg/L	mg/L	mg/L	mg/L
07/31/2012	1	1	0	12.4	23.5	8.7	15.6	196	4.0	98.1	250	294	7.0	281	0.5	99.8	32	598	2.4		
08/31/2012	0	0	0	12.2	20.2	8.0	12.5	208	3.0	98.5	191	290	9.0	247	0.4	99.8	29	302	2.0		
09/30/2012	2	1	0	14.2	32.5	10.6	26.9	153	4.0	97.5	305	203	5.0	220	0.3	99.9	29	280	1.8		
10/31/2012	0	1	0	15.1	25.4	15.1	25.4	156	3.0	98.0	302	205	5.0	253	0.6	99.8	58	422	1.6		
11/30/2012	0	1	0	11.8	13.7	8.8	11.7	200	4.0	98.1	268	270	7.0	267	1.1	99.6	78	318	8.8		
12/31/2012	2	2	0	16.8	27.5	15.6	24.9	166	4.0	97.4	466	269	6.0	216	0.5	99.8	61	306	1.4		
01/31/2013	4	0	0	22.3	40.0	19.9	35.3	109	3.0	96.7	505	214	6.0	193	0.4	99.8	64	430	1.4		
02/28/2013	0	0	0	16.0	23.8	15.3	41.9	125	3.0	97.6	369	169	4.0	168	0.8	99.4	100	252	1.6		
03/31/2013	0	0	0	15.7	21.3	13.2	20.2	153	3.0	97.7	364	240	7.0	233	0.7	99.7	79	334	1.4		
04/30/2013	8	0	0	19.0	41.9	16.8	37.4	133	3.0	97.7	384	168	3.0	202	0.5	99.7	82	288	1.2		
05/31/2013	5	0	0	20.5	38.7	18.4	34.0	122	3.0	97.5	423	185	4.0	191	0.5	99.7	73	244	1.6		
06/30/2013	2	0	0	13.7	17.0	10.4	16.9	162	3.0	97.9	279	211	5.0	242	0.6	99.7	54	378	2.4		
07/31/2013	9	0	0	19.8	36.0	14.8	31.6	121	3.0	97.1	465	173	6.0	209	0.7	99.7	87	306	1.4		
08/31/2013	0	0	0	14.7	17.8	9.2	13.8	148	3.0	98.0	217	229	6.0	243	0.7	99.7	50	348	1.8		
09/30/2013	0	0	0	14.1	16.2	8.3	11.2	146	3.0	98.1	187	204	4.0	277	0.4	99.8	27	358	1.6		
10/31/2013	0	0	0	14.1	16.0	8.6	10.5	184	2.0	98.7	161	225	3.0	276	0.1	100	6	392	1.0		
11/30/2013	0	0	0	14.1	19.1	8.4	14.0	200	2.0	99.0	141	248	3.0	230	0.0	100	0	270	0.0		
12/31/2013	0	1	0	19.5	31.3	14.6	25.7	170	2.0	98.8	239	236	3.0	194	0.0	100	0	326	0.0		
01/31/2014	0	2	0	19.4	28.5	14.8	23.4	188	2.0	99.0	241	241	3.0	217	0.0	100	2	290	0.4		
02/28/2014	3	0	0	22.9	38.8	18.8	32.7	167	3.0	98.0	494	236	5.0	238	0.0	100	0	398	0.0		
03/31/2014	3	1	0	18.7	38.3	16.4	34.6	179	3.0	98.2	463	248	5.0	219	0.0	100	0	340	0.0		
04/30/2014	0	0	0	17.2	28.5	14.0	25.3	177	3.0	98.2	309	234	3.0	268	0.0	100	0	384	0.0		
05/31/2014			0	15.0	23.8	11.9	19.7	209	3.0	98.5	303	268	5.0	238	0.2	99.9	15	392	2.0		
06/30/2014	0	0	0	12.6	15.9	8.3	14.4	218	3.0	98.5	218	295	5.0	248	0.0	100	1	318	0.2		
07/31/2014	0	0	0	13.4	24.8	7.5	18.7	205	3.0	98.6	186	240	3.0	269	0.1	100	8	464	0.6		
08/31/2014	0	0	0	12.6	15.1	6.8	10.3	184	3.0	98.2	191	256	5.0	256	0.0	100	0	390	0.0		
09/30/2014	0	1	0	12.6	17.5	7.2	10.9	167	3.0	97.9	181	272	3.0	262	0.0	100	2	376	0.2		
10/31/2014	8	1	0	17.4	39.4	12.2	32.8	171	3.0	98.0	331	279	5.0	226	0.3	99.9	32	496	1.6		
11/30/2014	0	1	0	17.7	30.8	12.3	23.2	185	4.0	98.0	369	235	6.0	201	0.0	100	0	382	0.0		
12/31/2014	0	1	0	19.1	29.0	15.8	25.8	175	3.0	98.1	450	238	5.0	229	0.0	100	0	326	0.0		
01/31/2015	0	0	0	18.9	28.1	15.5	24.6	161	2.2	98.6	286	276	3.5	385	0.1	100	10	582	1.2		
02/28/2015	2	0	0	18.7	37.7	15.5	31.8	106	0.9	99.1	125	222	2.4	282	0.0	100	8	470	0.4		
03/31/2015	1	0	0	21.0	37.4	18.1	33.5	96	1.4	98.6	207	158	2.4	171	0.0	100	6	274	0.4		
04/30/2015	0	0	0	18.0	22.5	14.4	18.3	127	1.9	98.5	224	168	3.1	183	0.0	100	5	264	0.6		
05/31/2015	0	0	0	13.5	15.6	8.7	11.4	149	1.9	98.7	142	217	2.6	241	0.0	100	0	322	0.0		
06/30/2015	0	0	0	15.4	21.6	10.6	18.8	138	2.7	98.0	231	184	5.9	241	0.1	100	9	346	0.6		
07/31/2015	0	0	0	14.6	28.7	13.1	26.2	154	2.1	98.6	210	229	3.3	254	1.8	99.3	175	680	21.6		
08/31/2015	0	0	0	13.3	20.7	10.5	15.8	172	2.4	98.6	205	226	3.4	404	1.3	99.6	119	1936	3.0		
09/30/2015	0	2	0	9.7	11.4	7.8	9.2	170	2.2	98.7	144	191	3.2	264	0.0	99.9	23	352	2.0		
10/31/2015	0	2	0	10.2	12.6	10.2	14.0	172	2.2	98.7	185	260	4.1	316	0.5	99.8	47	768	2.0		
11/30/2015	0	0	0	10.0	20.8	12.8	35.4	179	2.6	98.5	262	249	3.9	326	0.6	99.9	57	948	3.4		
12/31/2015	7	4	0	14.3	25.7	19.9	36.8	165	1.2	99.2	202	217	2.7	314	0.5	99.8	81	568	1.4		
Standard Dev.	3	1	0	3.1	8.6	3.9	9.1	28	1	1	108	36	2	40	0.3	0	33	85	1.6		
Minimum	0	0	0	11.8	13.7	6.8	10.3	109	2	97	141	168	3	168	0.0	99	0.0	244	0.0		
Maximum	9	2	0	22.9	41.9	19.9	41.9	218	4	99	505	295	9	385	1.1	100	100	598	8.8		
Average	2	0	0	16.2	26.5	12.5	22.8	168	3	98	308	236	5	239	0.3	100	32	364	1.3		
Permit Limit	Report	Report	Report	Report	Report	Report	Report	Report	5/10	85%	667/1334	Report	10/20	Report	30	85%	1251	Report	45		
Count	30	30	31	31	31	31	31	28	31	28	31	28	31	31	31	28	31	31	31		

Murfreesboro – Sinking Creek STP (Rationale)  
NPDES Permit TN0022586  
Page R-23

Date	Ammonia as N			Nitrate-Nitrite					Total Nitrogen		Total Phosphorous				
	Monthly		Daily	Effluent Monthly Average Conc.	Effluent Monthly Average Amount	Effluent Daily Max. Conc.	Effluent Daily Maximum Amount	Calculated Annual Load	Effluent Monthly Average Conc.	Effluent Monthly Average Amount	Effluent Monthly Average Conc.	Effluent Monthly Average Amount	Effluent Daily Max. Conc.	Effluent Daily Maximum Amount	Calculated Annual Load
	Average Conc.	Average Amount	Maximum Conc.												
	mg/L	lb/day	mg/L	mg/L	lb/day	mg/L	lb/day	lb/day	mg/L	lb/day	mg/L	lb/day	mg/L	lb/day	lb/day
07/31/2012	0.1	8	0.2	4.4	345	4.4	349		6.0	476	2.3	178	2.8	217	
08/31/2012	0.1	7	0.1	5.1	303	5.2	364		6.3	374	3.9	230	4.0	266	
09/30/2012	0.1	11	0.6	5.5	5.75	6.5	678		6.6	691	1.9	165	3.0	218	
10/31/2012	0.1	10	0.1	5.3	619	5.3	769	461	6.2	727	2.4	262	2.9	266	208
11/30/2012	0.1	7	0.1	6.0	395	6.2	458		7.7	506	4.5	301	5.5	406	
12/31/2012	0.1	13	0.1	5.0	541	5.5	641		6.6	717	1.8	198	2.2	256	
01/31/2013	0.1	18	0.2	6.0	843	6.1	929		7.2	1015	1.2	181	2.1	320	
02/28/2013	0.1	13	0.1	6.2	680	6.2	732		7.4	816	3.2	347	3.3	360	
03/31/2013	0.1	17	0.8	3.3	265	5.0	393		4.7	381	3.3	272	3.4	292	
04/30/2013	0.1	18	0.5	1.7	173	2.3	288		2.8	264	0.9	71	1.1	84	
05/31/2013	0.2	28	0.9	2.1	381	2.9	617	480	3.1	536	1.3	181	2.0	241	208
06/30/2013	0.2	19	0.8	0.8	69	0.9	73	402	1.9	157	0.7	54	0.9	69	184
07/31/2013	0.1	17	0.4	1.1	111	1.4	166	280	2.1	215	1.1	114	1.4	166	173
08/31/2013	0.4	28	1.2	1.3	81	1.3	83	180	2.6	169	2.2	139	2.5	159	138
09/30/2013	0.2	13	1.2	0.9	64	1.0	68	146	2.0	134	2.4	160	2.6	177	120
10/31/2013	0.1	9	0.5	1.4	111	1.6	125	136	2.5	203	1.4	116	1.5	117	127
11/30/2013	0.3	19	3.1	1.7	111	1.9	124	91	4.3	293	1.4	95	1.6	111	113
12/31/2013	0.1	15	0.3	0.9	97	1.0	112	96	2.0	214	0.9	87	1.4	140	119
01/31/2014	0.4	50	2.8	1.9	213	2.0	215	113	3.3	363	2.0	217	3.8	400	136
02/28/2014	0.3	46	1.0	1.6	175	1.6	186	129	3.1	351	1.0	114	1.6	186	132
03/31/2014	0.2	47	2.2	1.7	208	2.1	269	153	2.9	353	1.2	137	2.2	249	128
04/30/2014	0.1	17	1.0	1.1	97	1.5	135	150	2.1	190	1.6	136	2.1	182	131
05/31/2014	0.1	10	0.1	1.3	129	1.8	179	153	2.2	223	0.9	93	1.2	119	131
06/30/2014	0.1	7	0.1	0.9	49	1.2	65	145	1.9	104	2.9	159	3.9	212	143
07/31/2014	0.1	7	0.3	0.7	37	0.9	43	116	1.9	97	1.6	84	2.0	96	121
08/31/2014	0.1	6	0.2	1.4	69	1.5	79		2.7	138	3.9	202	5.0	264	
09/30/2014	0.1	7	0.4	1.6	100	1.8	133	80	2.9	175	4.4	272	4.8	355	158
10/31/2014	0.2	17	1.2	1.5	106	2.0	180	82	2.5	162	1.4	82	1.4	117	149
11/30/2014	0.2	19	0.7	1.5	123	1.9	171		2.5	202	2.6	212	3.2	287	
12/31/2014	0.2	25	0.9	1.5	137	1.6	159		3.5	321	1.4	132	1.5	171	
01/31/2015	0.2	36	1.9	1.7	221	2.0	305		3.0	401	1.9	233	2.4	253	
02/28/2015	0.2	36	1.0	1.9	206	2.3	255		2.9	323	2.7	302	2.7	304	
03/31/2015	0.2	27	0.7	1.4	242	1.7	340		2.2	366	0.9	150	1.1	156	
04/30/2015	0.1	12	0.1	1.2	164	1.6	205		2.0	285	1.0	140	1.2	183	
05/31/2015	0.1	10	0.7	0.6	35	0.8	36		1.7	109	4.9	338	5.0	455	
06/30/2015	0.1	10	0.2	1.6	93	1.8	113		2.4	141	3.8	222	3.9	226	
07/31/2015	0.1	14	1.4	0.9	134	1.0	202		1.6	215	0.7	124	1.1	222	
08/31/2015	0.1	11	0.6	1.7	121	3.3	237		3.1	204	2.7	183	4.4	317	
09/30/2015	0.1	7	0.1	1.4	100	2.2	168		2.4	174	3.2	217	4.2	256	
10/31/2015	0.1	10	0.7	1.7	118	1.8	139		2.5	177	2.6	188	3.3	262	
11/30/2015	0.3	48	2.4	0.7	60	0.7	67		1.7	151	3.1	271	3.1	290	
12/31/2015	0.2	42	1.1	1.0	119	1.1	144	135	1.8	227	2.9	357	3.3	376	227
Standard Dev.	0.09	12.14	0.8	1.9	205	1.9	243.6	128	1.9	232	1.1	74	1.2	92	29
Minimum	0.10	6.00	0.1	0.7	6	0.9	43.0	80	1.9	97	0.7	54.0	0.9	69.0	113.0
Maximum	0.40	50.00	3.1	6.2	843	6.5	929.0	480	7.7	1015	4.5	347.0	5.5	406.0	208.0
Average	0.16	18.19	0.8	2.5	221	2.8	293.2	189	3.8	354	2.1	168.5	2.6	217.9	145.5
Permit Limit	1/2.2	133/294	2/4.4	Report	Report	Report	Report	520	9.0	1201	Report	Report	Report	Report	Report
Count	31	31	31	31	31	31	18	18	31	31	31	31	31	31	18

Date	Ecoli		Selenium		Settleable Solids	Dissolved Oxygen	Whole Effluent Toxicity (WET) Testing		UV Light Working	pH	
	Monthly Average Conc.	Daily Max. Conc.	Monthly Average Conc.	Daily Max. Conc.	Daily Max. Conc.	Daily Min. Conc.	Ceriodaphnia	Pimephales		Daily Min. Conc.	Daily Max. Conc.
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	Y/N	SU	SU
07/31/2012	18	88	0.0014	0.0018	0	7.4			Y	7.6	8.2
08/31/2012	14	50	0.0024	0.0029	0	7.3	100	100	Y	7.6	8.1
09/30/2012	61	240	0.0017	0.0023	0	7.0			Y	7.6	8.4
10/31/2012	50	206	0.0022	0.0028	0	8.4			Y	7.5	8.2
11/30/2012	125	320	0.0035	0.0044	0	8.3			Y	7.5	8.0
12/31/2012	11	54	0.0021	0.0025	0	9.0			Y	7.4	8.0
01/31/2013	3	10	0.0014	0.0017	0	8.5			Y	7.1	7.9
02/28/2013	31	288	0.0018	0.0025	0	10.0			Y	7.4	7.7
03/31/2013	29	266	0.0017	0.0023	0	9.7			Y	7.4	7.8
04/30/2013	5	45	0.001	0.001	0	7.2			Y	7.3	8.0
05/31/2013	19	226	0.0014	0.0018	0	6.0			Y	7.4	7.8
06/30/2013	47	160	0.0017	0.0022	0	6.1			Y	7.2	8.1
07/31/2013	8	22	0.001	0.001	0	6.0	100	100	Y	7.2	8.2
08/31/2013	17	114	0.0016	0.002	0	6.4			Y	7.5	8.0
09/30/2013	5	12	0.0013	0.0015	0	7.1			Y	7.6	8.1
10/31/2013	15	100	0.002	0.0024	0	6.6			Y	7.6	8.1
11/30/2013	11	42	0.0012	0.0013	0	7.6			Y	7.6	8.1
12/31/2013	3	9	0.0022	0.0024	0	6.0			Y	7.3	7.7
01/31/2014	5	29	0.0015	0.002	0	6.0	100	100	Y	7.2	7.8
02/28/2014	23	128	0.0018	0.0018	0	6.5			Y	7.1	7.7
03/31/2014	14	118	0.0011	0.0011	0	6.7			Y	7.1	7.7
04/30/2014	35	206	0.0022	0.0022	0	8.6			Y	7.1	7.8
05/31/2014	30	176	0.0016	0.002	0	7.9			Y	7.5	8.0
06/30/2014	10	96	0.0031	0.0038	0	7.6			Y	7.3	8.2
07/31/2014	59	258	0.0017	0.0024	0	7.2			Y	7.3	8.1
08/31/2014	25	92	0.0022	0.0028	0	7.2			Y	7.1	8.1
09/30/2014	19	92	0.001	0.001	0	7.3			Y	7.6	8.0
10/31/2014	23	160	0.001	0.001	0	7.0	44.5	100	Y	7.3	8.0
11/30/2014	34	114	0.002	0.002	0	6.9			Y	7.2	7.6
12/31/2014	14	60	0.002	0.002	0	6.3			Y	7.1	7.5
01/31/2015	8	240	0.002	0.002	0	8.6			Y	7.1	7.5
02/28/2015	13	240	0.002	0.002	0	7.3	100	100	Y	7.1	7.6
03/31/2015	2	18	0.002	0.002	0	6.2			Y	7.2	7.4
04/30/2015	2	14	0.002	0.002	0	7.7			Y	7.3	7.5
05/31/2015	5	104	0.002	0.002	0	9.4			Y	7.3	7.6
06/30/2015	8	240	0.002	0.002	0	8.6			Y	7.3	7.9
07/31/2015	8	240	0.002	0.002	0	8.4			Y	7.3	7.7
08/31/2015	18	320	0.002	0.002	0	8.1			Y	7.3	7.7
09/30/2015	5	52	0.002	0.002	0	8.4	100	99	Y	7.2	7.5
10/31/2015	7	43	0.002	0.002	0	8.3			Y	7.2	7.5
11/30/2015	2	320	0.002	0.002	0	7.4			Y	7.1	7.5
12/31/2015	2	87	0.002	0.002	0	7.2			Y	7.0	7.5
Standard Dev.	24	91	0.0006	0.0008	0	1.1	25	0	#DIV/0!	0.2	0.2
Minimum	3	9	0.0010	0.0010	0.00	6.0	44.5	100.0	0.00		7.5
Maximum	125	320	0.0035	0.0044	0.00	10.0	100	100	0	7.6	
Average	25	130	0.0018	0.0021	0.00	7.4	89	100	#DIV/0!	7.3	7.9
Permit Limit	126/100 ml	941/100 ml	Report	Report	1.0 ml/L	6.0 mg/L	92.8	92.8	0.02	6.0	9.0
Count	31	31	31	31	31	31	5	4	31	31	31

## APPENDIX 3

### Metal and Toxic Parameter Calculations

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The following procedure is used to calculate the allowable instream concentrations for pass-through guidelines and permit limitations.

- a. The most recent background conditions of the receiving stream segment are compiled. This information includes:
  - \* 7Q10 of receiving stream (MGD)
  - \* Calcium hardness
  - \* Total suspended solids
  - \* Background metals concentrations
  - \* Other dischargers impacting this segment (none)
  - \* Downstream water supplies, if applicable
- b. The chronic water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.
- c. The acute water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel, zinc and silver. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions for the following metals: cadmium, copper, lead, nickel and silver.
- d. The resulting allowable trivalent and hexavalent chromium concentrations are compared with the effluent values characterized as total chromium on permit applications. If reported total chromium exceeds an allowable trivalent or hexavalent chromium value, then the calculated value will be applied in the permit for that form of chromium unless additional effluent characterization is received to demonstrate reasonable potential does not exist to violate the applicable state water quality criteria for chromium.
- e. A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of no more than 90%.

The following formulas are used to evaluate water quality protection:

$$C_m = \frac{Q_s C_s + Q_w C_w}{Q_s + Q_w}$$

where:

Cm = resulting in-stream concentration after mixing  
Cw = concentration of pollutant in wastewater  
Cs = stream background concentration  
Qw = wastewater flow  
Qs = stream low flow

**to protect water quality:**

$$C_w \leq \frac{(S_A) [C_m (Q_s + Q_w) - Q_s C_s]}{Q_w}$$

where (S<sub>A</sub>) is the percent "Stream Allocation".

Calculations for this permit have been done using a standardized spreadsheet, titled "Water Quality Based Effluent Calculations." Division policy dictates the following procedures in establishing these permit limits:

1. The critical low flow values are determined using USGS data:

Fish and Aquatic Life Protection

7Q10 - Low flow under natural conditions

1Q10 - Regulated low flow conditions

Other than Fish and Aquatic Life Protection

30Q2 - Low flow under natural conditions

2. Fish & Aquatic Life water quality criteria for certain Metals are developed through application of hardness dependent equations. These criteria are combined with dissolved fraction methodologies in order to formulate the final effluent concentrations.
3. For criteria that are hardness dependent, chronic and acute concentrations are based on a Hardness of 25 mg/L and Total Suspended Solids (TSS) of 10 mg/L unless STORET or Water Supply intake data substantiate a different value. Minimum and maximum limits on the hardness value used for water quality calculations are 25 mg/L and 400 mg/L respectively. The minimum limit on the TSS value used for water quality calculations is 10 mg/L.
4. Background concentrations are determined from the division database, results of sampling obtained from the permittee, and/or obtained from nearby stream sampling data. If this background data is not sufficient, one-half of the chronic "In-stream Allowable" water quality criteria for fish and aquatic life is used. If the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, then the measured background concentration is used in lieu of the chronic "In-stream Allowable" water quality criteria for the purpose of calculating the appropriate effluent limitation (C<sub>w</sub>). Under these circumstances, and in the event the "stream allocation" is less than 100%, the calculated chronic effluent limitation for fish and aquatic life should be equal to the chronic "In-stream Allowable" water quality criteria. These guidelines should be strictly followed where the industrial source water is not the receiving stream.



Where the industrial source water is the receiving stream, and the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, consideration may be given as to the degree to which the permittee should be required to meet the requirements of the water quality criteria in view of the nature and characteristics of the receiving stream.

The spreadsheet has fifteen (15) data columns, all of which may not be applicable to any particular characteristic constituent of the discharge. A description of each column is as follows:

**Column 1:** The "Stream Background" concentrations of the effluent characteristics.

**Column 2:** The "Chronic" Fish and Aquatic Life Water Quality criteria. For cadmium, copper, trivalent chromium, lead, nickel, and zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Continuous Concentration (CCC) is calculated using the equation:

$$CCC = (\exp \{ m_C [ \ln (\text{stream hardness}) ] + b_C \} ) (CCF)$$

CCF = Chronic Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.03 and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent; no chronic criterion exists for silver. Published criteria are used for non-metal parameters.

**Column 3:** The "Acute" Fish and Aquatic Life Water Quality criteria. For cadmium, copper, trivalent chromium, lead, nickel, silver, and zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Maximum Concentration (CMC) is calculated using the equation:

$$CMC = (\exp \{ m_A [ \ln (\text{stream hardness}) ] + b_A \} ) (ACF)$$

ACF = Acute Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.03 and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent. Published criteria are used for non-metal parameters.

**Column 4:** The "Fraction Dissolved" converts the value for dissolved metal at laboratory conditions (columns 2 & 3) to total recoverable metal at in-stream ambient conditions (columns 5 & 6). This factor is calculated

using the linear partition coefficients found in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996) and the equation:

$$\frac{C_{\text{diss}}}{C_{\text{total}}} = \frac{1}{1 + \{ [K_{\text{po}}] [\text{ss}]^{(1+a)} [10^{-6}] \}}$$

ss = in-stream suspended solids concentration [mg/l]

Linear partition coefficients for streams are used for unregulated (7Q10) receiving waters, and linear partition coefficients for lakes are used for regulated (1Q10) receiving waters. For those parameters not in the dissolved form in columns 2 & 3 (and all non-metal parameters), a Translator of 1 is used.

- Column 5:** The "Chronic" Fish and Aquatic Life Water Quality criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 2 by the value in column 4.
- Column 6:** The "Acute" Fish and Aquatic Life Water Quality criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 3 by the value in column 4.
- Column 7:** The "Chronic" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the chronic limit.
- Column 8:** The "Acute" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the acute limit.
- Column 9:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Organism Consumption (Recreation).
- Column 10:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Water and Organism Consumption. These criteria are only to be applied when the stream use classification for the receiving stream includes both "Recreation" and "Domestic Water Supply."
- Column 11:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Domestic Water Supply.
- Column 12:** The Calculated Effluent Concentration associated with Organism Consumption.
- Column 13:** The Calculated Effluent Concentration associated with Water and Organism Consumption.

**Column 14:** The Calculated Effluent Concentration associated with Domestic Water Supply.

**Column 15:** The Effluent Limited criteria. This upper level of allowable pollutant loading is established if (a) the calculated water quality value is greater than accepted removal efficiency values, (b) the treatment facility is properly operated, and (c) full compliance with the pretreatment program is demonstrated. This upper level limit is based upon EPA's 40 POTW Survey on levels of metals that should be discharged from a POTW with a properly enforced pretreatment program and considering normal coincidental removals.

The most stringent water quality effluent concentration from Columns 7, 8, 12, 13, 14, and 15 is applied if the receiving stream is designated for domestic water supply. Otherwise, the most stringent effluent concentration is chosen from columns 7, 8, 12, and 15 only.

## WQ Based Effluent Calculations

2013 WQC

**PASS-THROUGH LIMITATIONS FOR METALS AND OTHER TOXIC SUBSTANCES  
WATER QUALITY BASED EFFLUENT CALCULATIONS  
OUTFALL 001**

FACILITY: Murfreesboro STP PERMIT #: TN0022586 DATE: 3/7/2016 CALC BY: JAH

non-regulated stream worksheet (7Q10)

Stream	Stream	Waste	Ttl. Susp.	Hardness	Margin of
(7Q10)	(30Q5)	Flow	Solids	(as CaCO3)	Safety
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
0.200	0.600	20.000	10	172	90

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Stream Bckgmd. Conc.	Fish/Aqua. Life (F & AL) WQC lab conditions	Chronic	Acute	Fraction Dissolved	F & AL- instream allowable ambient conditions (Tot)	Chronic	Acute	Calc. Effluent Concentration based on F & AL	Human Health Water Quality Criteria *							Application
PARAMETER	[ug/l]	[ug/l]	[ug/l]	[Fraction]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	In-Stream Criteria	Water/Organisms	DWS	Organisms	Water/Organisms	DWS	effluent limited case	ug/L
									Organisms	Water/Organisms	DWS	Organisms	Water/Organisms	DWS	ug/l	ug/L
Copper (a,b)	2.0	14.2	22.4	0.348	41.0	64.4	37.2	58.6	N/A	N/A		N/A			80.0	20.0
Chromium III	1.0	115.6	888.4	0.202	571.3	4392.1	519.3	3992.4	N/A	N/A		N/A			10.0	10.0
Chromium VI	1.0	11.0	16.0	1.000	11.0	16.0	10.0	14.5	N/A	N/A		N/A			10.0	10.0
Chromium, Total	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A			60.0	10.0
Nickel (a,b)	10.0	82.3	740.8	0.432	190.3	1713.6	172.9	1557.6	4600.0			4263.93			180.0	20.0
Cadmium (a,b)	1.0	0.4	3.4	0.252	1.4	13.5	1.3	12.3	N/A			N/A			5.0	5.0
Lead (a,b)	1.0	4.5	115.9	0.184	24.6	630.4	22.3	573.1	N/A			N/A			45.0	5.0
Mercury (T) (c,e)	0.006	0.8	1.4	1.000	0.8	1.4	0.7	1.3	0.051			0.05			0.4	0.2
Silver (a,b,f)	1.0	N/A	8.2	1.000	N/A	8.2	N/A	7.4	N/A			N/A			5.0	10.0
Zinc (a,b)	3.0	187.0	185.5	0.288	649.5	644.2	590.4	585.6	26000.0			24101.92			200.0	15.0
Cyanide (d)	2.6	5.2	22.0	1.000	5.2	22.0	4.7	20.0	140.0			129.71			230.0	280.0
Toluene	0.0								15000.0			13905.00			15.0	5.0
Benzene	0.0								510.0			472.77			3.0	1.0
1,1,1 Trichloroethane	0.0								N/A			N/A			30.0	1.0
Ethylbenzene	0.0								2100.0			1946.70			4.0	1.0
Carbon Tetrachloride	0.0								16.0			14.83			15.0	1.0
Chloroform	0.0								4700.0			4356.90			85.0	5.0
Tetrachloroethylene	0.0								33.0			30.59			25.0	1.0
Trichloroethylene	0.0								300.0			278.10			10.0	1.0
1,2 trans Dichloroethylene	0.0								10000.0			N/A			1.5	1.0
Methylene Chloride	0.0								5900.0			5469.30			50.0	5.0
Total Phenols	0.0								860000.0			797220.00			50.0	40.0
Naphthalene	0.0								N/A			N/A			1.0	1.0
Total Phthalates	0.0								N/A			N/A			64.5	NA

- a Denotes metals for which Fish & Aquatic Life Criteria are expressed as a function of total hardness.  
b The criteria for this metal is in the dissolved form at lab conditions. The calculated effluent concentration is in the total recoverable form.  
c The chronic criteria for mercury is not converted to dissolved, since it is based on fish tissue data rather than toxicity.  
d The criteria for this parameter is in the total form.  
e Previously, the Division established that 0.006 ug/L would be maximum background default if no sample data available or if all samples were <RDL (<0.2 ug/L), based on reference stream monitoring by DOE.  
f Silver limit is daily max if column 8 is most stringent.  
g When columns 7 or 8 result in a negative number, use results from columns 5 or 6, respectively.  
h When columns 12, 13 or 14 result in a negative number, use results from columns 9, 10 or 11, respectively, as applicable.

\* Domestic supply included in river use so pick from columns 7,8,12,13,14,15 or Domestic supply not included in river use so pick from columns 7, 8, 12 or 15.

\*\* Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 30Q5 flow.

## SAR Summary

TN 0022586	PTL 4/18/2006	85% PTLs	PTL 12/8/2009	Oct-15	Apr-15	Oct-14	Apr-14	13-Oct	Apr-13	Oct-12	Apr-12
COPPER	<b>0.04224</b>	<b>0.03507</b>	<b>0.04126</b>	0.00340	0.00350	0.00120	0.00120	0.00100	0.00160	0.00470	0.00570
CHROMIUM, III	n/a	<b>0.47680</b>	<b>0.56094</b>	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	
CHROMIUM, VI	n/a	<b>0.00847</b>	<b>0.00996</b>	<b>0.01000</b>	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	
CHROMIUM, TOTAL	<b>0.06000</b>	n/a	n/a	0.00100	0.00130	0.00100	0.00100	0.00100	0.00012	0.00320	0.00190
NICKEL	<b>0.18000</b>	<b>0.15300</b>	<b>0.18000</b>	0.00310	0.00290	0.00410	0.00410	0.00160	0.00190	0.00340	0.00340
CADMIUM	<b>0.00141</b>	<b>0.00115</b>	<b>0.00135</b>	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050
LEAD	<b>0.02609</b>	<b>0.02142</b>	<b>0.02520</b>	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
MERCURY	<b>0.00001</b>	<b>0.00004</b>	<b>0.00005</b>	0.00000	0.00000	1.130E-08	2.000E-05	0.00000	2.000E-05		2.000E-05
SELENIUM	n/a	n/a	report	0.00200							
SILVER	<b>0.00500</b>	<b>0.00425</b>	<b>0.00500</b>	0.00050	0.00050	0.00050	0.00050	0.00050	0.00093	0.00050	0.00050
ZINC	<b>0.20000</b>	<b>0.17000</b>	<b>0.20000</b>	0.04710	0.05600	0.03200	0.03200	0.01900	0.01800	0.04700	0.04700
CYANIDE	<b>0.00471</b>	<b>0.00400</b>	<b>0.00471</b>	<b>0.00500</b>	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
TOLUENE	<b>0.01500</b>	<b>0.01275</b>	<b>0.01500</b>								
BENZENE	<b>0.00300</b>	<b>0.00255</b>	<b>0.00300</b>								
1,1,1 TRICHLOROETHANE	<b>0.03000</b>	<b>0.02550</b>	<b>0.03000</b>								
ETHYLBENZENE	<b>0.00400</b>	<b>0.00340</b>	<b>0.00400</b>								
CARBON TETRACHLORIDE	<b>0.00840</b>	<b>0.00714</b>	<b>0.00840</b>								
CHLOROFORM	<b>0.07000</b>	<b>0.05950</b>	<b>0.07000</b>								
TETRACHLOROETHYLENE	<b>0.00700</b>	<b>0.00595</b>	<b>0.00700</b>								
TRICHLOROETHYLENE	<b>0.00840</b>	<b>0.00714</b>	<b>0.00840</b>								
1,2 TRANS-DICHLOROETHYL	<b>0.00150</b>	<b>0.00128</b>	<b>0.00150</b>								
METHYLENE CHLORIDE	<b>0.05000</b>	<b>0.04250</b>	<b>0.05000</b>								
TOTAL PHENOLS	<b>0.05000</b>	<b>0.04250</b>	<b>0.05000</b>	0.04000	0.04000	0.04000	0.04000	0.04000	0.04000	0.04000	0.04000
NAPHTHALENE	<b>0.00100</b>	<b>0.00085</b>	<b>0.00100</b>								
TOTAL PHTHALATES	<b>0.00350</b>	<b>0.00298</b>	<b>0.00350</b>								

Bolded in effluent data exceeds 85% of proposed PTLs

Shaded means detection level

## APPENDIX 4

### WQ Based Effluent Calculations- Other Compounds

WATER QUALITY BASED EFFLUENT CALCULATIONS OUTFALL 001																					
FACILITY: Murfreesboro - Sinking Creek PERMIT: TN0022586 DATE: 4/29/2016																					
	Stream (7Q10)	Stream (30Q5)	Waste Flow	Ttl. Susp. Solids	Hardness (as CaCO3)	Margin of Safety															
	(MGD)	(MGD)	(MGD)	(mg/l)	(mg/l)	(%)															
	0.200	0.600	20.000	10	172	90															
PARAMETER	1	2		3	5		6	7	8	9			10		11	12		13		14	15
	Stream Bckgmd. Conc.	Detection Levels			Fish/Aqua. Life Water Quality Criteria			Calculated Effluent Concentration		Human Health Water Quality Criteria (30Q5)			Calculated Effluent Concentration			Human Health Water Quality Criteria (30Q5)		Calculated Effluent Concentration		Avg. daily effluent	
	(ug/l)	Scan MDL	WQC RDL *EPA MDL	(ug/l)	(ug/l)	(ug/l)	Chronic [ug/l]	Acute [ug/l]	Organisms [ug/l]	Water/Org [ug/l]	DWS [ug/l]	Organisms [ug/l]	Water/Org [ug/l]	DWS [ug/l]	Organisms [ug/l]	Water/Org [ug/l]	DWS [ug/l]	Organisms [ug/l]	Water/Org [ug/l]	DWS [ug/l]	ug/l
ANTIMONY		3.8	3.0						640.0			593.3									<20
ARSENIC		1.0	1.0	150.0	340.0	136.4	309.1	10.0				9.3									<20
BERYLLIUM		2.0	1.0								3.0										<2
SELENIUM		5.0	2.0	5.0	20.0	4.55	18.2														<20
THALLIUM		5.0	*						0.47	0.24	2.0		0.4			0.2	1.9				<20
ACROLEIN	0.0	50.0	1.0						290.0			268.8									<50
ACRYLONITRILE	0.0	50.0	1.0						2.5	0.11		2.3									<10
BENZENE	0.0	1.0	1.0						510.0			472.8									<1
BROMOFORM	0.0	1.0	1.0						1400.0	5.0		1297.8	5.0								<1
CARBON TETRACHLORIDE	0.0	1.0	1.0						16.0			14.8									<1
CHLOROBENZENE	0.0	1.0	*						1600.0	130.0		1483.2	120.0								<1
CHLORODIBROMO-METHANE	0.0	1.0	*						130.0			120.5									<1
CHLOROETHANE	0.0	1.0	*																		<5
2-CHLORO-ETHYL VINYL ETHER	0.0	1.0	*																		<50
CHLOROFORM	0.0	5.0	0.5						4700.0	5.0		4356.9	5.0								<5
DICHLOROBROMO-METHANE	0.0	1.0	1.0						170.0			157.6									<1
1,1-DICHLOROETHANE	0.0	1.0	1.0						NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1
1,2-DICHLOROETHANE	0.0	1.0	1.0						370.0			343.0									<1
TRANS 1,2-DICHLORO-ETHYLENE	0.0	1.0	*						10000	140.0	100.0	9270.0	120.0	92.7							<1
1,1-DICHLOROETHYLENE	0.0	1.0	1.0																		<1
1,2-DICHLOROPROPANE	0.0	1.0	*						150.0	5.0	5.0	139.1	4.5	4.5							<1
1,3-DICHLORO-PROPYLENE	0.0	1.0	1.0						210.0	3.4		194.7									<1
ETHYLBENZENE	0.0	1.0	1.0						2100	530.0	750.0	1946.7	491.1	545.0							<1
METHYL BROMIDE	0.0	1.0	*						1500.0			1390.5									<1
METHYL CHLORIDE	0.0	1.0	1.0																		<5
METHYLENE CHLORIDE	0.0	5.0	1.0						5900.0			5469.3									<5
1,1,2,2-TETRACHLORO-ETHANE	0.0	1.0	0.5						40.0	1.7		37.1	1.6								<1
TETRACHLORO-ETHYLENE	0.0	1.0	0.5						33.0			30.6									<1
TOLUENE	0.0	1.0	1.0						15000	1300.0	1000.0	13905.0	1205.1	927.0							<5
1,1,1-TRICHLOROETHANE	0.0	1.0	1.0																		<1
1,1,2-TRICHLOROETHANE	0.0	1.0	0.2						160.0	5.0	5.0	148.3	5.1	4.5							<1
TRICHLOROETHYLENE	0.0	1.0	1.0						300.0			278.1									<1
VINYL CHLORIDE	0.0	1.0	2.0						24.0	0.25	2.0	22.2	0.2	1.9							<1
P-CHLORO-M-CRESOL	0.0	10.0	*																		<1
2-CHLOROPHENOL	0.0	10.0	*						150.0	81.0		139.1	75.1								<10
2,4-DICHLOROPHENOL	0.0	10.0	*						290.0			268.8									<10
2,4-DIMETHYLPHENOL	0.0	10.0	*						850.0	100.0		795.0	100.0								<10
4,6-DINITRO-O-CRESOL	0.0	10.0	24.0						280.0			259.6									<10
2,4-DINITROPHENOL	0.0	10.0	42.0						5300.0	89.0		4913.1	84.0								<10
2-NITROPHENOL	0.0	10.0	*																		<10
4-NITROPHENOL	0.0	10.0	*																		<10
PENTACHLOROPHENOL	0.0	10.0	5.0	15	19	13.6	17.3	30.0				27.8									<10
PHENOL	0.0	10.0	*						1700000	21000.0		1575000.0	11012.0								<10
2,4,6-TRICHLOROPHENOL	0.0	10.0	2.7						24.0			22.2									<10
ACENAPHTHENE	0.0	10.0	*						990.0	970.0		917.7	921.1								<1
ACENAPHTHYLENE	0.0	10.0	2.3																		<1
ANTHRACENE	0.0	10.0	0.7						40000	8350.0		37080.0	2084.1								<1
a. Columns 7-8, and 12-14 are the effluent concentrations allowable to prevent exceedence of water quality criteria. b. Potential to exceed criteria exists if the measured quantity in column 15 exceeds, or could exceed, the calculated allowable concentrations in columns 7-8, and 12-14. c. Additional testing is required if the detection level used in the scan is higher than the state RDL and/or the MDL of the approved EPA scan method and industry is known to have that pollutant. d. All background concentrations for these volatile organic, acid-extractable, and base-neutral compounds are assumed zero in the absence of supporting monitoring data. e. Other metals for which data were provided on the application are evaluated on the Metals & Toxics spreadsheet. f. The downstream hardness was calculated based on an application effluent hardness of 172 mg/L. g. Reasonable potential does not exist for the following reason(s): The required MDL has been used and resulted in non-detection (BDL) or the contributing industrial processes are NOT likely to contain them.																					

WATER QUALITY BASED EFFLUENT CALCULATIONS  
OUTFALL 001

FACILITY: Murfreesboro - Sinking Creek  
PERMIT: TN0022586  
DATE: 4/29/2016

Stream (7Q10)	Stream (30Q5)	Waste Flow	Ttl. Susp. Solids	Hardness (as CaCO3)	Margin of Safety
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
0.200	0.600	20.000	10	172	90

PARAMETER	1	2	3	5	6	7	8	9	10	11	12	13	14	15
	Stream Bckgrnd. Conc.	Detection Levels		Fish/Aqua. Life Water Quality Criteria		Calculated Effluent Concentration		Human Health Water Quality Criteria (30Q5)			Calculated Effluent Concentration			Avg. daily effluent
		Scan	WQC RDL	Chronic	Acute	Organisms	Water/Org	DWS	Organisms	Water/Org	DWS			
		MDL	*EPA MDL									In-Stream Criteria	Calculated Effluent Concentration	
	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
BENZIDINE	0.0	50.0	*					0.0020			0.002			<10
BENZO(A)ANTHRACENE	0.0	10.0	0.3					0.18	0.038		0.2	0.0		<1
BENZO(A)PYRENE	0.0	10.0	0.3					0.18			0.2			<1
3,4 BENZO-FLUORANTHENE	0.0	10.0	0.3					0.18	0.038		0.2	0.0		<1
BENZO(GH)PERYLENE	0.0	10.0	*											<1
BENZO(K)FLUORANTHENE	0.0	10.0	0.3					0.18	0.038		0.2	0.0		<1
BIS (2-CHLOROETHOXY) METHANE														
BIS (2-CHLOROETHYL)-ETHER	0.0	10.0	*											<10
BIS (2-CHLOROISO-PROPYL) ETHER	0.0	10.0	1.0					5.3	0.30		4.9	0.3		<10
BIS (2-ETHYLHEXYL) PHTHALATE	0.0	10.0	*					65000			60255.0			<10
4-BROMOPHENYL PHENYL ETHER	0.0	10.0	2.5					22.0	12.0	6.0	20.4	11.1	5.6	<1
BUTYL BENZYL PHTHALATE	0.0	10.0	*											<10
2-CHLORONAPHTHALENE	0.0	10.0	*					1900.0	1500.0		1761.3	1300.0		<1
4-CHLOROPHENYL PHENYL ETHER	0.0	10.0	*					1600.0			1483.2			<1
CHRYSENE	0.0	10.0	*											<10
DI-N-BUTYL PHTHALATE	0.0	10.0	2.5					0.18			0.2			<1
DI-N-BUTYL PHTHALATE	0.0	10.0	2.5					4500.0	2000.0		4171.5	1854.0		<1
DI-N-OCTYL PHTHALATE	0.0	10.0	*											<1
DIBENZO(A,H) ANTHRACENE	0.0	10.0	*					0.18	0.038		0.2	0.0		<1
1,2-DICHLOROBENZENE	0.0	1.0	2.0					1300.0	420.0		1205.1			<1
1,3-DICHLOROBENZENE	0.0	5.0	2.0					960.0	320.0		889.9	200.0		<1
1,4-DICHLOROBENZENE	0.0	5.0	2.0					190.0	63.0		176.1			<1
3,3-DICHLOROBENZIDINE	0.0	10.0	*					0.28	0.2		0.3	0.2		<10
DIETHYL PHTHALATE	0.0	10.0	1.9					44000			40788.0			<1
DIMETHYL PHTHALATE	0.0	10.0	1.6					1100000	270000.0		1019700.0	250000.0		<1
2,4-DINITROTOLUENE	0.0	10.0	1.0					34.0			31.5			<10
2,6-DINITROTOLUENE	0.0	10.0	*											<10
1,2-DIPHENYLHYDRAZINE	0.0	10.0	*					2.0			1.9			<10
FLUORANTHENE	0.0	10.0	2.2					140.0	130.0		129.8	120.0		<1
FLUORENE	0.0	10.0	0.3					5300.0			4913.1			<1
HEXACHLOROBENZENE	0.0	10.0	1.9					0.0029	0.0025	1.0	0.003	0.0	0.0	<1
HEXACHLOROBUTADIENE	0.0	10.0	5.0					180.0			166.9			<10
HEXACHLOROCYCLO-PENTADIENE														
HEXACHLOROETHANE	0.0	10.0	*					1100.0	40.0	50.0	1019.7	37.1	30.4	<10
INDENO(1,2,3-CD)PYRENE	0.0	10.0	0.5					33.0			30.6			<10
ISOPHORONE	0.0	10.0	*					0.18	0.038		0.2	0.0		<1
NAPHTHALENE	0.0	10.0	*					9600			8899.2			<10
NITROBENZENE	0.0	10.0	10.0					690.0			639.6			<1
N-NITROSODI-N-PROPYLAMINE	0.0	10.0	*					5.1	0.050		4.7	0.0		<10
N-NITROSODI- METHYLAMINE	0.0	10.0	*					30.0			27.8			<10
N-NITROSODI-PHENYLAMINE	0.0	10.0	*					60.0	53.0		55.6	50.0		<10
PHENANTHRENE	0.0	10.0	0.7											<1
PYRENE	0.0	10.0	0.3					4000.0	830.0		3708.0	780.1		<1
1,2,4-TRICHLOROBENZENE	0.0		*					70.0	35.0		64.9			<10

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